

# The Design Necessity

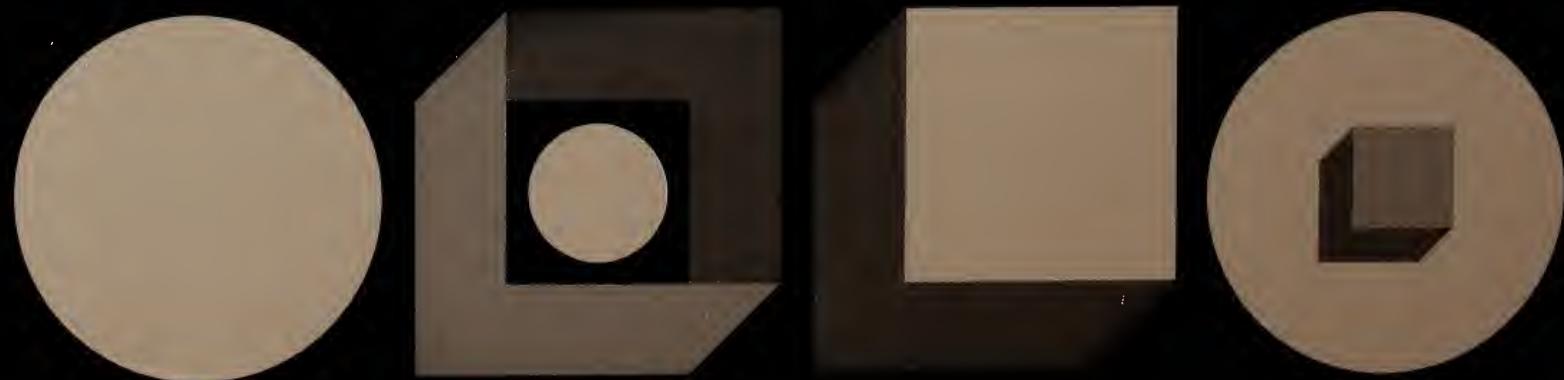
A Casebook  
of Federally Initiated  
Projects in

Visual Communications

Interiors and  
Industrial Design

Architecture

Landscaped Environment





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**A Casebook  
of Federally Initiated  
Projects in**

**Ivan Chermayeff  
Richard Saul Wurman  
Ralph Caplan  
Peter Bradford  
with  
Jane Clark**

**Visual Communications**

Prepared for the  
First Federal Design Assembly  
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**Interiors and  
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**Architecture**

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of Technology

**Landscaped Environment**

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What follows is a book-long definition of *the design necessity*. Initiated and produced for an Assembly directed toward Federal administrators, the book seeks to provide a definition of design for designers as well. The First Federal Design Assembly was not created as an end in itself but as a beginning—a vehicle for disseminating the ideas that led to its creation in the first place.

This book is not the result of an honor awards search. The projects in it were chosen to illuminate specific points in the development of our design definition. These points appear in the theme statement on page 4 and in "scan level" copy at the top of every page of text, an arrangement intended to make the book conform to the design performance criteria discussed in it.

In gathering material we learned a lot about the state of Federal design. Although many of the designs shown here are truly first-rate and gratifying, we are of course not uniformly satisfied with the examples selected. The obvious thinness of certain areas is grounds for immediate design concern.

A great many people helped in compiling the material that makes up this book. Our thanks to them appears in the form of the full project credits at the end of the volume. But three persons in particular deserve special mention here. Lani Lattin, Executive Secretary,

Federal Council on the Arts and the Humanities, and Bill N. Lacy, Director, Architecture + Environmental Arts, National Endowment for the Arts, were creative and constructive critics during the months *The Design Necessity* was in preparation. Jane Clark, who researched the book, performed with diligence and imagination and unfailing good humor.

Beginnings are at once difficult and exciting.

Ivan Chermayeff  
Richard Saul Wurman  
Ralph Caplan  
Peter Bradford

Washington, D.C., 2 April 1973

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The First Federal Design Assembly was devoted to an examination of "the design necessity."

The Assembly program discussed the necessity of design in visual communications, in interiors and industrial design, in architecture, and in the landscaped environment. Design was considered as an instrument of organization, a medium for persuasion, a means of relating objects to people, a method for improving safety and efficiency, and a way of coping with the complexity of contemporary Federal agency assignments.

The Assembly's emphasis, then, was on design *performance* in response to human needs.

Moreover, the emphasis was on *demonstrable* design performance. The Assembly program, the book called *The Design Necessity*, an exhibit and a short film all document the following points.

1. That there are sound, proven criteria to be applied in judging design effectiveness.
2. That design is an urgent requirement, not a cosmetic addition.
3. That design can save money.
4. That design can save time.
5. That design enhances communication between people.
6. That design simplifies use, simplifies manufacture, simplifies maintenance.
7. That the design necessity is recognizably present in projects ranging in scale and complexity

from a postage stamp to a national highway system.

8. That the absence of design is a hazardous kind of design. Not to design is to suffer the costly consequences of design by default.

9. That, on any given project, designers and Government officials are committed to the same basic goal: performance.

10. That effective design of public services is itself an essential public service.

Criteria for the design necessity are illustrated, in both the book and the exhibit, by case studies of Federally sponsored projects that work because they were designed to work. The case studies deal with significant aspects of design not visible on the surface, and discuss how problems were solved.

The aim of the First Federal Design Assembly was to present a clear and compelling view of design as a process. For in Government today that process is crucial.

### 1. There are sound, proven criteria for judging design effectiveness.

Design is necessary because it serves human needs. That is its only excuse for being. As human needs have become more complicated, and human beings more numerous, the design necessity has become more intense.

Nowhere is design more necessary than in the Federal Government, the nation's largest client for design in visual communications, interiors, industrial design, architecture, and in the landscaped environment.

Yet Federal design, like corporate design of 20 years ago, is often mistaken as a luxury. There are easily understood reasons for this misconception. A responsible government has to defend whatever it does on all fronts, and the handiest defense is quantification. It is easy to suppose that we cannot afford what we cannot measure.

Easy but invalid. Some design achievement—more than one might think—can be measured; but even where it cannot be, the *results* of design are measurable. And so are the results of nondesign, which is indefensible. Nondesign is truly what we cannot afford.

In the fifties the architect Richard Neutra wrote a book called *Survival by Design*. It was a stimulating book and became a popular one; but the title was even more popular than the book, perhaps because it seemed so highly innovative. The idea of *design* as a means of sur-

vival was surprising to many.

Yet everything that is made by men to serve human needs has to be designed. When we refer to the architect of a foreign policy program or the designer of a scientific experiment, we acknowledge that programs and experiments are as designed as are buildings, posters, and traffic circles.

Design itself is often what survives. And design is in large measure what civilizations and their governments are remembered by: how the public buildings looked and how the ruins look, what the soldiers wore, the shape of their weapons, the flags and banners. As a visual image *The Spirit of '76* carries meaning to Americans who have never read the Declaration of



Independence and even more meaning to those who have.

To think of Washington, D.C., is to think of the Jefferson, Washington, and Lincoln memorial monuments and of the Capitol dome.



But those are appearances, and the appearance of things is not to be trusted wholly. Yet we all know that appearances matter nonetheless. The aim of design is to bring form and performance into correspondence, not to substitute one for the other. The way things look is not irrelevant to the way things work: *how they work is how they should look*.

Looking right does not necessarily cost more than looking

wrong. After all, everything has to have *some* look. All other things being equal, beauty and ugliness carry the same price tag.

But this is not a book about beauty, although there are many handsome designs in it. Neither is this a collection of "best designs." It is a collection of designs executed for the Federal Government (either directly or with major Federal funding) and included here on the basis of performance.

The designs in this book have not been assembled for any honorific purpose, as in an awards program. Effective institutional design is rare enough to merit recognition; and awards programs, such as the General Services Administration's and the Department of Housing and Urban Development's, have their place. We have a different purpose. The projects shown here have been selected to illustrate one or more points about the design process.

That process is one in which objects, systems, and environments are related to people. When environments were simpler, objects fewer and handmade, communication less complex, and systems primitive, there was less need for a separate design function. Today we cannot survive without design, and in many areas of government no one would be foolish enough to try. No city, no highway, no traffic light, no spaceship, no transpor-



tation system would or could be brought forth without designers.

The need for design is less obvious in the case of office furnishings, office forms, public spaces, brochures, announcements, signs, courtrooms, information desks, agency reports, and so on. Yet the design necessity is operable in these areas, and we ignore it at our peril, or at least at great cost.

A badly designed questionnaire is unlikely to elicit useful responses. It may, in fact, keep people from responding at all. And the process of producing and handling a badly designed form can cost thousands of dollars in extra printing costs, typing costs, costs of needless errors, costs of duplicated information—to say nothing of the immeasurable cost of human frustration.

It should go without saying, but unfortunately doesn't, that design is directed toward human beings. To design is to solve human prob-

lems by identifying them, examining alternate solutions to them, choosing and executing the best solution.

Question: Who can do this?

Answer: A designer.

Question: Any designer?

Answer: Well, no. At least not equally well. Just as some designs are more necessary than others, some designers are more necessary than others.

Yet any designer is experienced in the process and has some understanding of the materials and methods appropriate to a given solution. *Appropriateness* is a key word: a sense of the appropriate lies at the heart of design judgment. That sense derives from the habitual vision of design in the service of people, rather than vice versa.

The late Henry Dreyfuss wrote of his industrial design practice:

"We bear in mind that the object being worked on is going to be ridden in, sat upon, looked at, talked into, activated, operated, or in some other way used by people individually or en masse."

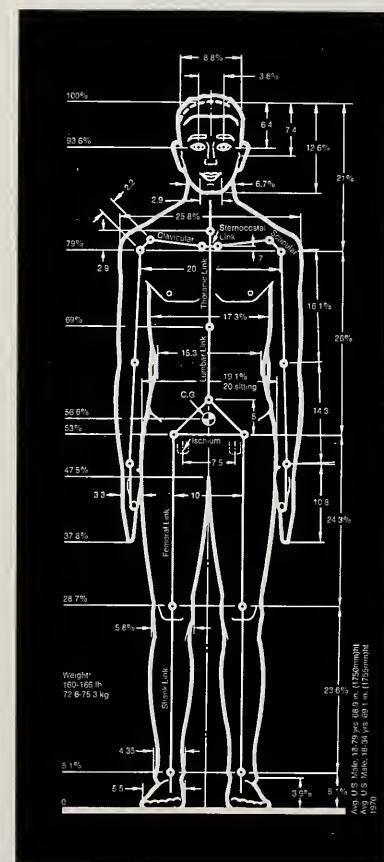
That sort of concern has become increasingly urgent in recent years. At the same time, scientific research has been yielding vast stores of information on human needs and behavior. It is the designer's responsibility to use this information in shaping the designed environment.

As a simple indication of the direction this might take we need look no further than the shift in emphasis in the Dreyfuss office alone.

During the forties Dreyfuss was in the vanguard of design-related human factors research, by virtue of his having developed anthropometric data relating to the essential measurements of men, women, and children. Niels Diffrient, a partner in the present Henry Dreyfuss Associates, has for years been developing materials that go beyond anthropometrics to bring together psychology, sociology, anthropology, lighting, and other disciplines in what he calls a "grammar of human comprehension."

Ideally, all designers would be knowledgeable in pediatrics and geriatrics, with some supplementary experience in dealing with the middle years. In fact this doesn't happen and won't. That does not mean that design can't take into account what science has revealed about people. It only means that, where complex problems are involved, design must be an interdisciplinary, collaborative process. In such a collaboration, design is the means of integrating the insights of other disciplines, bringing them to bear on problems, and giving form to the solutions.

Question: If designers vary in ability, and design varies in quality, how can I tell "good design" when I see it?



Answer: Forget (at least for the time being) about "good design." The fact that the phrase is in quotes suggests its ambiguity. If you think instead of *effective design*, it becomes easier to see the bases for judgments and your own qualifications for meeting them.

There are criteria for determining design effectiveness, and some

## 2. Design is an urgent requirement, not a cosmetic addition.

The most urgent requirement for people and other animals is the availability of certain life essentials: drinkable water, clean air, arable land, and food for both energy and cell building.

of them appear in the theme statement on page 4. These basic criteria overlap. (It is, for example, almost impossible to save time without saving money.) But that does not lessen their usefulness. It merely ensures that the most important points for evaluation will be covered one way or another.

It is important to remember that these are design criteria as well as designer's criteria. They suggest what design can do for consumers and clients, citizens and public officials. In the light of these criteria we can survey the projects assembled in this book.

The comprehensive plan for the future of Dallas (page 64) is rooted in an ecological study of the area. Although the Dallas plan starts with ecological data, it does not stop there. The ecological study is now being used to determine transit corridors. With design appearing first as persuasion, then regulation, then policy, the planners hope to make the design-planning process a normal feature of daily city government.

The Dallas approach dramatizes how very little genuine urban design has to do with beautification programs. It also dramatizes the fact that compromises, euphemistically known as trade-offs, are intrinsic to most difficult environmental decisions. Design is an instrument for revealing and communicating the precise point at which a trade-off is most sensible.

An official of the Department of Housing and Urban Development points out that the Dallas approach "uses design as the basic means to identify and communicate the options that are to be negotiated between the public and private sectors. Design approvals are becoming the most effective means that local governments have in modifying the important consequences that large-scale private developments exert in urban areas."

Similarly, in the Master Plan for Hawaii (page 70), design is the means by which the need for growth and the inevitability of growth may be reconciled with the deep need for preservation of land and landscape.

None of the projects on the following pages is merely cosmetic. None is an example of "applied design" added as a final touch to make things pretty or at least more palatable.

But the designs here are not all vehicles for biological survival either. There are levels of urgency in what people need; and our needs go far beyond the basic animal requirements for staying alive. We need room, we need an opportunity to keep in touch with natural resources, we need places for people to come together, we need public areas that encourage spontaneity and delight. And the urban environment is where we need all of these things the most.

The Portland Auditorium Forecourt Fountain (page 74) satisfies these urgent needs. Design at its best brings out people at their best. It is not so much that people "live up to" the splendors of the fountain and the related plazas and malls as that in enjoying the water they enjoy themselves and each other as well. Enjoyment of this sort is an urgent civic requirement.



### 3. Design can save money.

When the subject of design is introduced in an area in which design is not normally taken for granted, a predictable question comes up: Isn't it too expensive?

Whether it is expensive or cheap (and it can be either), there is no getting around the fact that design costs something. It has this in common with such other professional undertakings as medicine, religion, and public service. The question that needs to be asked, of course, is not whether design costs money but whether it is worth it. The answer depends on a number of variables and one of them is whether a given design saves money.

For that is one of design's purposes: to perform efficiently, reducing the cost of materials, labor, production and materials.

Design can save money in many ways. The wooden playground equipment in Tyson Park (page 68) has minimized maintenance. Moreover, by greatly increasing the park's use at all hours, the design seems thus far to have eliminated vandalism. (To get some idea of what a savings this represents one need only consider that New York City's new Parks Commissioner took office with the announcement that if neighborhoods continue to vandalize parks, or permit them to be vandalized, the City will simply stop trying to maintain them.)

That, like the Portland fountain, is a case of the public's rising to a

design. Vandalism diminishes in part because there are usually people around. But vandalism itself is often a response to design and a judgment about it.

Few schools anywhere are adequately budgeted. The design parameters for the Acorn School



(page 28) required that an unusual educational philosophy be expressed in an interior that didn't cost much money. By showing the way the building works, by exposing, rather than concealing, the building's operating equipment, and by using factory-made devices and systems, ordered right out of the catalog, the designers were able to effect a solution that simultaneously cuts cost and enhances learning.

Saving money is always a matter of choosing priorities. The design of the St. Francis Square Housing Project (page 44) reflects



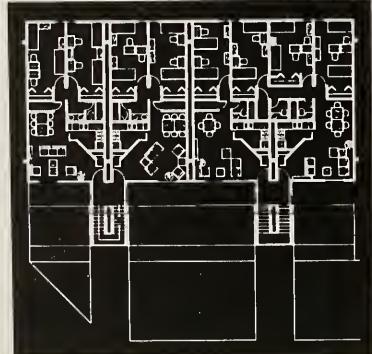
the architects' ordering of priorities in favor of the project's environmental aspects. The space between the buildings looks, and is, as important as the buildings themselves. This emphasis meant scrimping on such apartment specifications as kitchen size, hardly a trivial detail.

It would be nice not to have to make such choices at all, to have environmental amenity and large kitchens. But where housing project budgets force the choice, it is better that it be made knowingly and designed into the product as it was in this case.

Sometimes design can save money by incorporating procedures that already exist and don't have to be invented. Here the de-

signer's general knowledge can serve both him and his clients. The ecological study at the base of the Dallas Master Plan is economically computerized through the use of a program originally designed for the Wisconsin Light and Power Company. The use of industrial components for housing and schools saves money while it demonstrates the extreme flexibility of industrial technology.

Economy, like other features of design performance, is most likely to result when a client knows what he wants. The Dormitory Authority



of the State of New York made an initial contribution to minimizing the cost of its student housing at Brockport (page 42) through an unusually well developed system for evaluating bids. Paradoxically, the price was kept down by setting a predetermined per-bed cost, thus eliminating price as a factor in bidding. Performance was the sole criterion.

The most satisfying design experience is one in which a wide range of objectives are achieved at once. The National Park Service (NPS) "Minifolders" program



(page 14) comes close to fitting this description. The reduction in size first of all serves the park visitor, who can carry the folders in his or her shirt pocket. It serves Park Service employees by making storage and accessibility much easier. And because the employees can carry them in *their* shirt pockets too, each park worker becomes a reliable guide, able to answer questions at a glance.

Each of these design features is desirable in its own right, but the redesign grew out of an inescapable need for economy. For the National Park System, the sixties was a period of growth and change, unprecedented in both speed and variety. There were 188

parks in 1961; there are 298 today, and more are being planned. There were 86 million park visits in 1961, compared to 202 million visits in 1971. The early parks were established on Federal lands in the West; more recent parks are set up in areas complicated by joint state, local, and private ownership. National park "recreation" was quite a limited concept in the past, consisting largely of sightseeing and picnicking. The enormous popularity of camping and hiking—along with canoeing, diving, skiing, biking and snowmobiling—has vastly changed the character of National Park use.

One thing was clear: however many parks there were, however many people visited them, and whatever it was they did there—park management costs would soar unless something were done.

The minifolders hardly seem an adequate device for addressing problems of that magnitude, but they have greatly reduced costs of paper, typesetting, layout, printing, production, transportation, mailing, and storage.

#### 4. Design can save time.

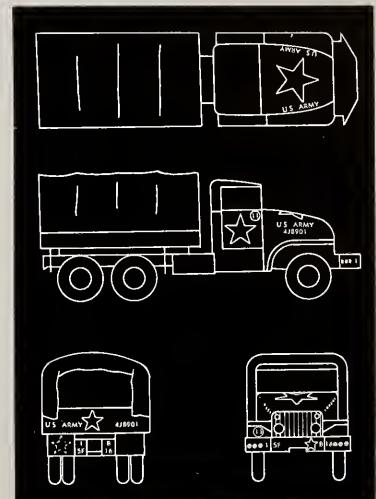
The NPS's minifolders save money in part because they save time in manufacturing. They also save the users' time, with clear maps and a minimum of guide prose.

The Brockport Design/Build System (page 42) is based on saving time through such techniques as on-site assembly of factory-made components and panelized cladding that can be attached from the inside of the building without scaffolding.

The system saves time by trimming both field labor and fabrication procedures. Dormitory systems usually take 30 to 48 months to complete after planning. This system will take 18 months.

One of the difficulties with any new graphics program can be the time it takes to implement it. Graphics standards manuals like those shown on page 20 generally have two purposes. One is to prevent the design from being vitiated somewhere along the line through carelessness or uninformed judgment. But designers can expect bad judgments because good ones are hard and time-consuming to make, especially by people with no qualifications for making them.

Trying to decide just how a trademark or symbol should be used on a truck or an interdepartmental memo form can take time. To reduce that time, by narrowing the areas in which decision can be made, is the other major purpose



of a standards manual. The Army painting program is a good example of graphics standards control based on the use of identifiable and consistent symbols.

If the jet plane symbolizes man's semi-conquest of time, the jet-age airport tends to symbolize just the opposite. It is by now commonplace to observe that getting a traveler to the plane can take more time than flying him to the airport of his destination. What can be done about it? The best-designed answer to date is probably Dulles International Airport (page 52), which was planned from the beginning for jets. That is to say, it was planned for jet passengers, who can reach their aircraft without having to take ten-minute walks through terminal "fingers."

## 5. Design enhances communication.

Designing a new kind of airport required radical decisions that would require the cooperation of the major airlines that used the airport. The necessity to make those decisions clear and to explain the reasons behind them presented a peculiar problem to the designers. Because the most compelling design parameters had to do with time and movement, the designers concluded that film was the only medium that could persuasively convey the complex message. A film, "The Expanding Air-

port," was commissioned and made. Produced primarily for a tiny audience of top airline executives, it became a significant tool for winning understanding and acceptance of the Dulles idea.

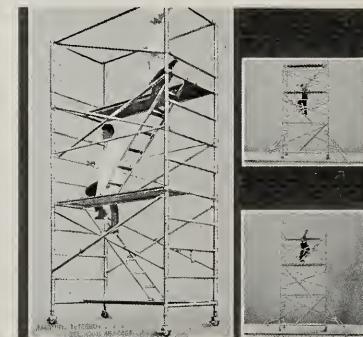
Among the most striking and useful Federal graphic products are the Department of the Interior Geological Survey maps like the one of Washington, D.C. shown below. It is both unjust and heartening that such a high order of design excellence should be taken for granted by so many of us.



Most communication between people does not happen through print. An office, a school, and a courthouse are all environments ostensibly created for the purpose of enhancing communication. Yet few schools and courthouses, and even fewer offices, are designed to perform this service well. The Washington Metropolitan Area Transit Authority (WMATA) Office System Proposal (page 32) reflects a growing trend in office design. The trend is to try to anticipate the kinds of communication

that take place, to identify the participants, and then to design a system that supports the process as strongly and as flexibly as possible.

The interior of the Acorn School (page 28) is designed to support the special communicative patterns of modified Montessori learning. As pointed out earlier, much of the school equipment comes



"out of the catalog." It is worth noting that a catalog does not obviate the need for design. In fact, just the opposite is true: design is required to make effective use of a catalog. Without design you have the average office building or the average mail-order-furnished room. With design, you can have the Acorn School.

## 6. Design simplifies use, manufacture, maintenance.

A project designed for performance and oriented to the human user is almost certain to meet more than one of the working criteria.

Design criteria rarely exist in isolation from one another. The design factors that save passengers time at Dulles International Airport (page 52) are the same factors that simplify the airport's use. The design factors that save money in the Acorn School, NPS Minifolders Program, St. Francis Square Housing Project, and the Brockport Design/Build System are the factors that simplify manufacture, maintenance, and use.



**7. Design necessity is recognizably present in projects ranging in scale and complexity from a postage stamp to a highway system.**

The designs selected for this book cover a wide range of design problems in the Federal Government. An NPS minifolder is, by definition, very small. Dulles International Airport is very large and designed to

become much larger when the occasion demands. Most design problems fall between those two extremes. But the urgency of a designed solution does not depend on the size of the project.



**8. The absence of design is a hazardous kind of design. Not to design is to suffer the costly consequences of design by default.**

Just as "no-politics is a kind of politics," no-design is a kind of design. There are no examples in this book of design by default, at least not deliberately. But examples abound and are all about you. As a matter of statistical probability, you probably work in an environment that was designed by the space and the furnishings rather than by a designer thinking of the work that has to be done and the people who have to do it.

That environment is called the office. It is where 40 percent of the nation's working population do their work against odds made staggering by the absence of design. There is, to be sure, plenty of decoration in offices. But, apart from size and accessories, it is difficult to distinguish the office of an accountant from that of a writer, a sales manager, a salesman, a supervisor, a department head, a contractor, or a designer.

By the late sixties this phenomenon had attracted some serious attention and research. Among the results are a variety of "open plans" or, in the jargon of the trade, "office landscaping."

Open planning had commonly been used in factories but was unusual in offices—except in newspaper offices, where it was the rule. The city desk ringed by available editor-reporters was based on the need for quick communication with relatively little concern

for privacy. But office layouts tended generally to award privacy according to rank, rather than the kind of work done, and to seriously inhibit communication.

In the fifties the rabbit-warren office complex was challenged by designers who rediscovered open planning at about the same time elementary schools were beginning to rediscover it. It happened during a period when architects generally had stopped talking about rooms and started talking



about "space." The term "office landscaping" was attached to a German firm called Quickborner Team, and it became known as the Quickborner approach.

In America designer Robert Propst had for years been studying

offices in a new way. Investigating what people did in offices, he came up with a lively set of observations. He found what Government workers must always have known but never codified: that important (or at least useful) information was squirreled away in drawers and never used or even seen again, while unimportant (or at least unusable) information was clogging desktops, offices, and minds. Viewing the office as "a facility for change," Propst developed recommendations for the kind of environment and equipment that would make desired change feasible. Through a furniture manufacturer he translated his ideas into a line of office furniture and related accessories designed to make work efficient in a variety of possible office plans.

## 9. On any given project, designers and Government officials have the same basic goal: performance.

"Unless there is a commitment from above, design won't work," says Vincent Gleason, Chief of the Division of Publications, National Park Service.

He surely is right, especially in respect to design in a large and complex institution, such as Government. But the commitment cannot be given form until there are clear performance goals.

Having a goal does not necessarily mean being able to describe the goal in design terms. As a general rule, therefore, the designer or design team ought to be involved in a project early.

To call in a designer for the first time after decisions affecting design have been made is always a mistake and often a tragic one. Designers called in, for example, after hardware specifications have been frozen have to either "design around" arbitrary obstacles or to

"undesign" what was wrongly done in the first place.

In either case the result is time consuming, expensive, and less than fully effective.

That error was fortunately avoided in the Atomic Energy Commission exhibition on page 22. The designer was called in to develop a trailer exhibition to travel in Latin America. He accepted the assignment with the stipulation that the AEC suspend any commitment to trailers until he had made a preliminary study. The study indicated that an air-supported structure promised to make a more effective, more flexible, more economical exhibition than a trailer would have. The result was a major exhibition that had impact and duration far beyond that customarily expected of trailer shows.

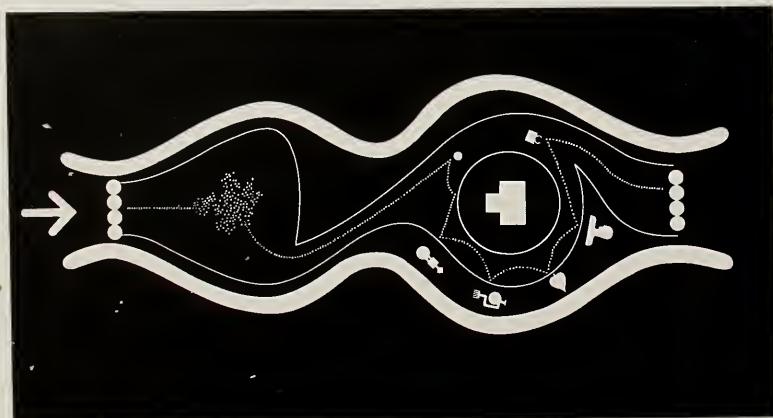
For some design projects the performance goals are so specific,

and their achievement dependent upon such highly specialized study, that "the designer" is really a team. The Magruder Environmental Therapy Complex in Orlando, Florida, is a good example of what such an interdisciplinary team can accomplish.

Magruder is a playground designed to make major play experi-



ences accessible to physically handicapped children. In achieving this the designers—an architect, a psychologist, physical therapist, physical education expert, school principal, and others—expect to improve the children's mental health, increase their educability, and make new discoveries about the relationship between play and learning.



## 10. Effective design of public services is itself an essential public service.

Such services as our national parks, our courthouses, our Federally sponsored schools and transportation systems and museums and housing projects are the most tangible forms through which Government reaches the public. In a democracy, then, these are the forms through which we get in touch with ourselves. That is the design necessity.

Design will not create peace out of war, affluence out of poverty, commitment out of cynicism, or justice out of injustice. It will not right social wrongs. It will not even make up for lack of talent.

But an environment can help bring out the best in people or the worst. We rise to our problems in order to design. We rise in response to designed environment. That is the design necessity.

The problems of Government are complex, and their solutions depend upon diverse resources. As a way of applying interdisciplinary insights to the lives and work of human beings, design is necessary to Government. The effective design of public services is indeed an essential public service in itself.

And that is the design necessity.



## Visual Communications

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Commission exhibition	22

National Park Service  
Minifolders

Funding Agency:  
Department of the Interior  
National Park Service

Designers:  
National Park Service  
Division of Publications Staff,  
Vincent Gleason, Chief



Drastic size reduction and  
modular format save money,  
save time, enhance com-  
munication, and simplify  
manufacture and use.

**Saves money: individual  
folder cost drops from 4½¢  
to 2½¢.**

The brochures shown here are "minifolders" distributed by the National Park Service at more than half of the nearly 300 national parks. In 1973 NPS will publish some 150 different minifolders with a print run of 16 to 17 million.

Effective design depends upon a clear perception of the problem or problems to be solved. A common means of identifying the problem is to look for the intersection of objectives and constraints.

The general objective of the National Park Service's (NPS) free folders program is straightforward enough: to tell park visitors about the particular parks they are visiting. But how much information should be supplied and what kind?

The Park Service defined what the typical visitor needs as follows:

1. A brief text telling where to go, what to see and when.
2. An accurate, easily read map, with pictures and diagrams.
3. Information about such matters as safety, clothing, weather and altitude.
4. Information about food and accommodations.

As a design constraint, all of that basic information was to be offered in a folder small enough to fit into a shirt pocket or purse.

In a large-volume Federal print program, however, the primary constraints are usually budgetary. Congressional restrictions limit the money spent for publication. Regu-

**Revised format for giveaway  
folders frees staff to spend  
time improving literature  
that the Park Service sells.**

lations set by the Joint Committee on Printing restrict color reproduction and paper stock. There are costs of shipping and storage and of distribution to the public.

The minifolder program succeeds within these constraints and in fact gets improved results because of them. The paper, colors, and typeface are all more appropriate to the job of the folders than more lavish treatment would be.

The Division of Publications in 1964 proposed reducing the free folder to the smallest size and the lowest cost. Information in more depth, and with more flavor than the minifolder could provide, would be offered in one of the publications that are sold.

## "The place where Hell bubbled up"

A  
history  
of the  
first  
national  
park

The savings are obvious enough: less paper, less expensive shipping, simpler handling. And the time-saving features range from simpler distribution to fewer arguments about cover illustrations

(there are no cover illustrations). Many in the NPS are convinced that the new program has improved the quality of information in the free folder (since the information is basic, it is easier to be accurate and current) and in the process freed the publication division to turn its attention to the user-subsidized sales publications, improving them in turn.

Vincent Gleason, Chief of the Division of Publications, summarizes the minifolder savings:

*Format:* "Text material is reduced, and annual changes have been made easier and cheaper. Layout problems are simplified to a few combinations. Maps are standardized. Type is restrained to a few faces and measures."

*Printing:* "Low-cost paper is specified, and less paper is used. Most of the minifolders are printed in two colors. Press time is more efficient because there are more impressions per hour."

*Shipping and storage:* "We use fewer cartons for packing, and it costs less to ship. The minifolder is easier to hand out and cheaper to mail."

*Average current costs:* "A new regular folder costs 4½¢; a new minifolder, 2½¢. A reprinted regular folder costs 2½¢; a reprinted minifolder, 1½¢.

"A careful estimate would put the combined time and money savings at 20 percent."

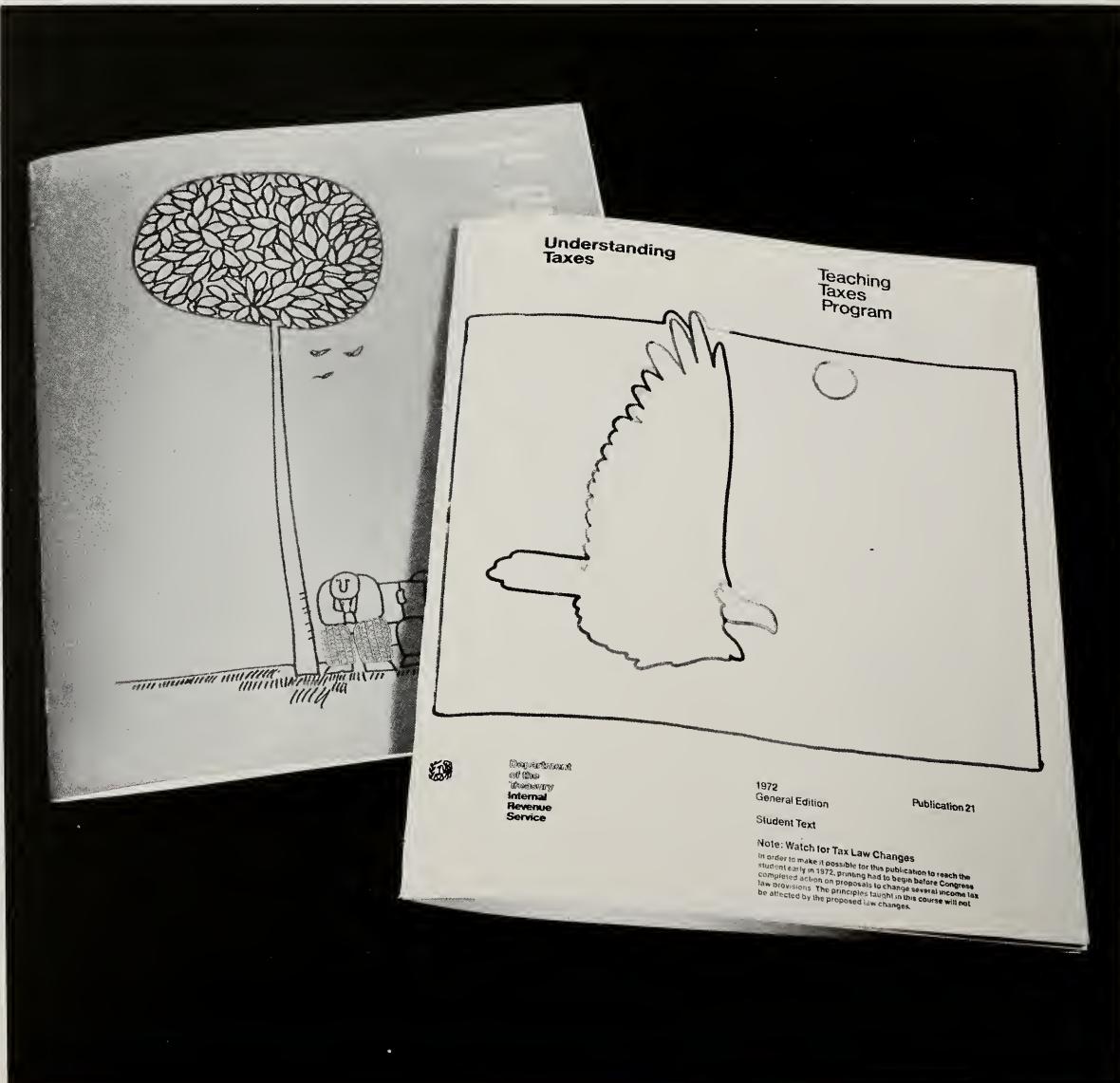
**Covers are usually one  
color. Maps are simplified.  
Text is condensed to basic  
information. Copy, of stand-  
ardized width, is typewriter-  
set in house.**



## Graphics Programs for the Internal Revenue Service

Funding Agency:  
Department of the Treasury  
Internal Revenue Service

Designers:  
("Teaching Taxes")  
IRS Publishing Services Branch  
Design Group, David Haussman,  
Betty Moran, Project Designers  
(Recruiting Brochures)  
IRS Publishing Services Branch  
Design Group,  
Dick Servatius, Project Designer



**"Teaching Taxes" program uses rotogravure publications designed to look like Sunday supplements. They go to 4,000,000 students in 24,000 schools across the country.**

At the heart of Federal spending is Federal income, or taxes. And at the heart of the Federal tax system are self-assessment and voluntary compliance. These features of the Federal tax system place upon the citizen the burden of deciding how much he owes the Government as well as the burden of paying it.

Even if paying taxes were easy, computing them is not. Yet citizens have to do it, regardless of their arithmetical sophistication, in the face of new regulations, policies, codes, rulings, etc.

A number of design problems come together here. Tax forms must look as welcome as possible under circumstances that make it very unlikely that they will ever be truly welcome. Explanatory publications must make complicated issues clear. Publications have to perform well without any hint of lavishness, which might seem particularly inappropriate for the Internal Revenue Service.

Graphic design for the Internal Revenue Service is, in other words, the point at which the Federal Government of the United States regularly addresses its individual citizens, usually on the same subject, which happens to be less than agreeable.

Voluntary compliance is a significant IRS cost-saving policy, for it makes the citizen a partner in the bookkeeping and compilation process. The function of the IRS

educative programs is to make him a knowledgeable partner. With the help of these materials the IRS expects this year's tax returns to reflect a 90 percent voluntary compliance with the law.

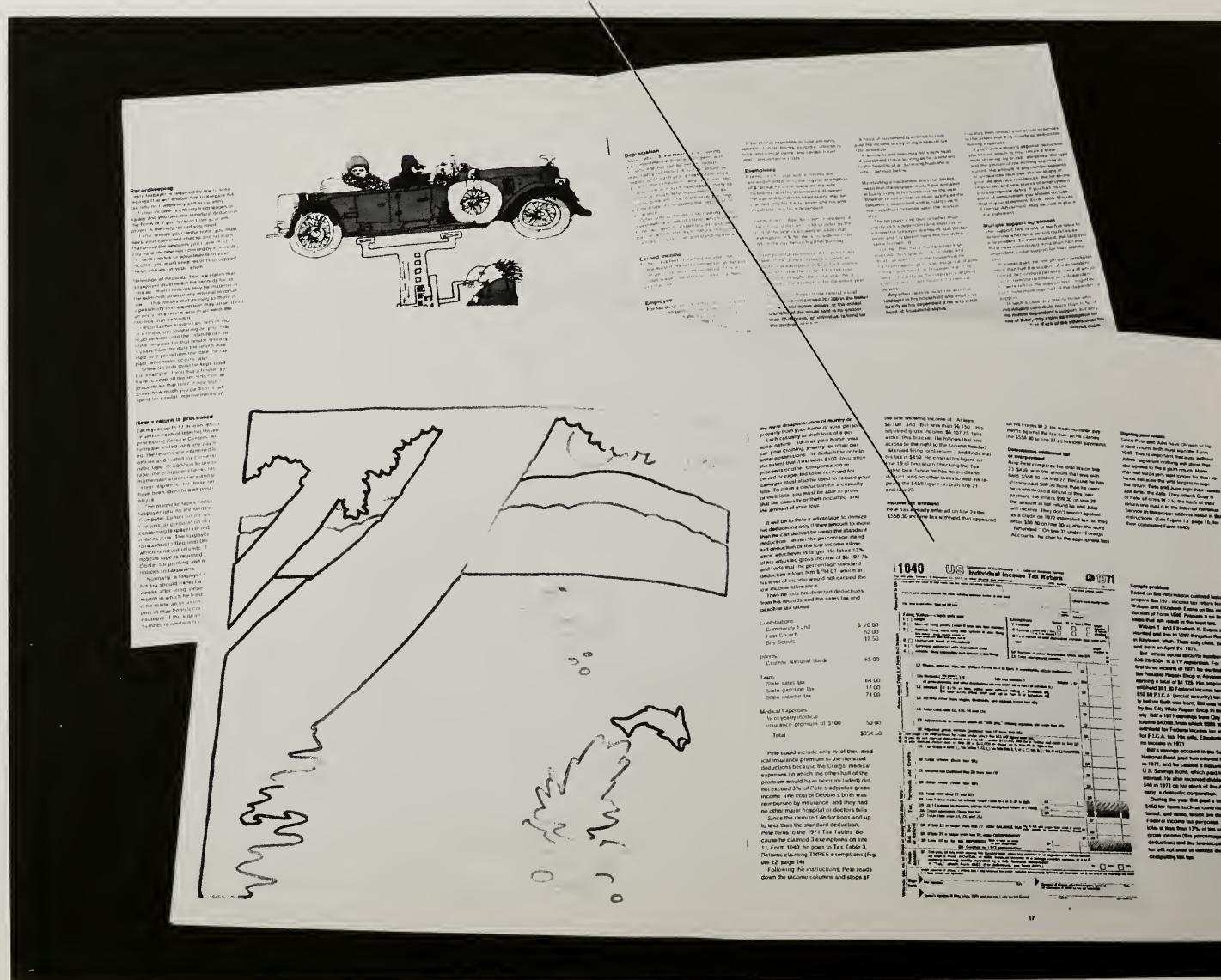
Much of the IRS communication effort goes into bringing technical information to accountants, tax lawyers, and other specialists. But a certain amount of technical information has to be presented to the layman as well, and this is perhaps the biggest challenge faced by the IRS. The service publishes special-problem materials, always



strongly identified on the cover, as in the "Farmer's Tax Guide."

The Internal Revenue Service's recent emphasis on clarity in its forms and on public understanding of its procedures has given the Publishing Services Branch of IRS an educative function. Its "Under-

**Increased format size saves money, reducing page total by 25 percent. Album format enhances IRS educative function by permitting legible display of tax forms keyed to explanatory text.**



**The Internal Revenue Service issues one publication designed to show IRS employment opportunities in general. Other publications help recruit people for specific jobs.**



standing Taxes" program is designed to reach high school students just as they are about to become taxpayers.

"Understanding Taxes"—General Edition (Publication 21) had an initial 1971 printing of four million. This was not enough. A barrage of enthusiastic requests from teachers and school principals required an additional printing of 20,000.

The two "Understanding Taxes" booklets shown here are 10 $\frac{3}{4}$ " by 12 $\frac{3}{4}$ " and are almost identical, except that one is designed for suburban youth, and the other has several pages of additional material for rural youth. The material is lucid and nonpatronizing both in text and in illustrations.

The illustrations are essential, for most of them are simply reproductions of the tax forms themselves, showing how they should be filled out under various circumstances. Illustrations are closely keyed to the text. In the previous format (7 $\frac{3}{4}$ " by 10 $\frac{1}{4}$ ") each tax form had to take up a page in order to be legible. By going to the larger "album" style the designers were able to reduce the total number of pages from 64 to 48, with a marked savings in printing and production costs.

Another IRS problem addressed in part by graphic design is recruitment. In the late fifties IRS administrators came to believe that they were not getting their fair

share of the talent pool. Investigating the recruiting procedures of large industrial corporations, they discovered a great disparity between the quality of corporate recruiting literature and their own literature. As a result IRS designers created a new set of recruiting materials, with each job category treated in a separate two- or three-color brochure.

The recruiting brochures are sent out to 58 district offices and their college representatives and to ten service centers.

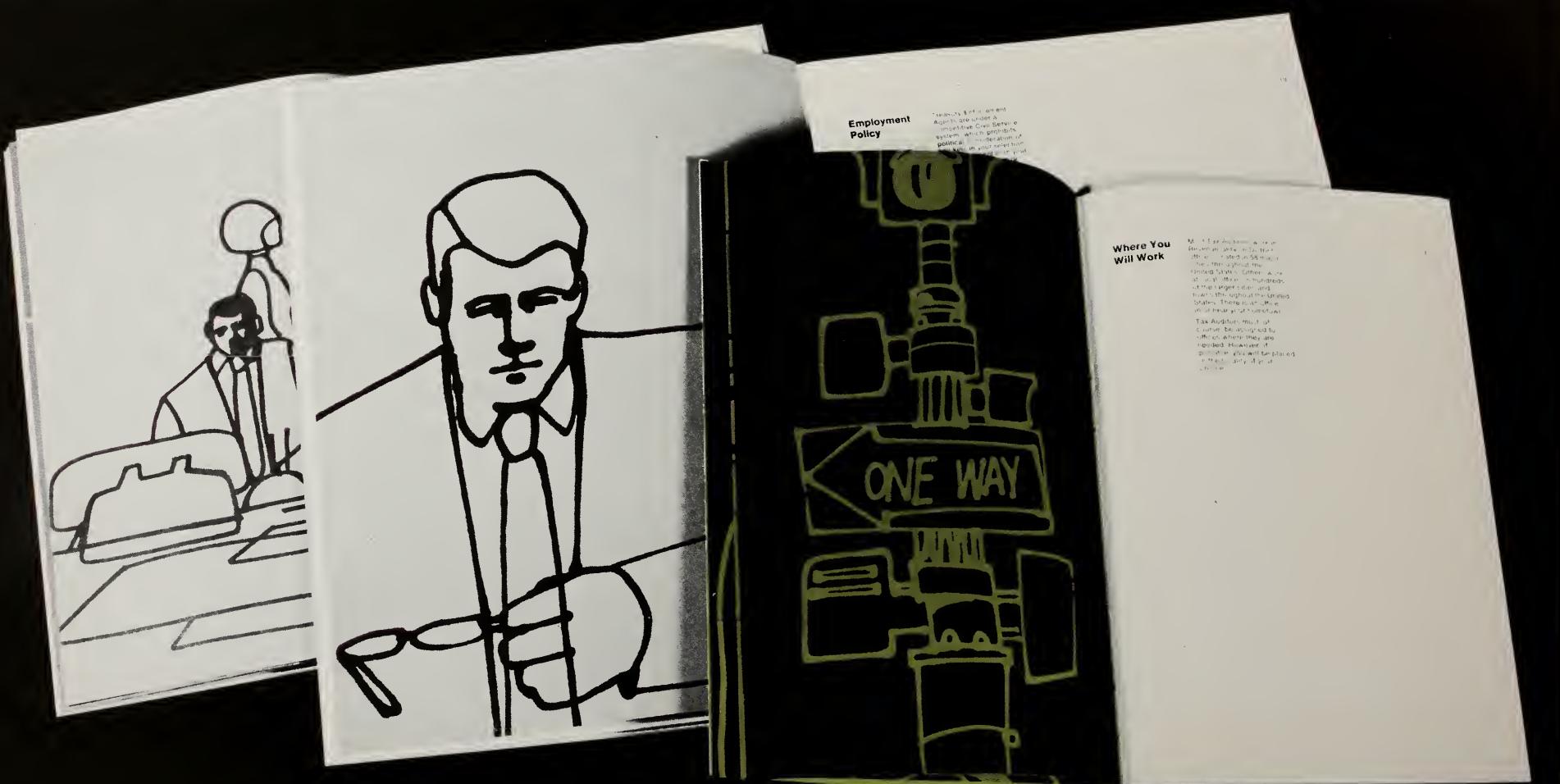
Of the six recruiting brochures, five deal with specific jobs and are intended chiefly for college employment offices. The sixth, "A New Dimension in Taxation," contains general information on IRS opportunities and is used to answer general requests.

Talent recruitment is one area in which industry and the Federal Government are competitive. IRS recruitment officers feel that the image of the IRS in particular, and the Federal Government in general, tended to be one of "green eyeshades." These brochures help counter that image for both prospective employees and recruiting agents, who are proud to be associated with the new materials.

In the words of James Pugh, IRS Director of Recruitment, "The new brochures attracted college students that we otherwise never would even have seen."

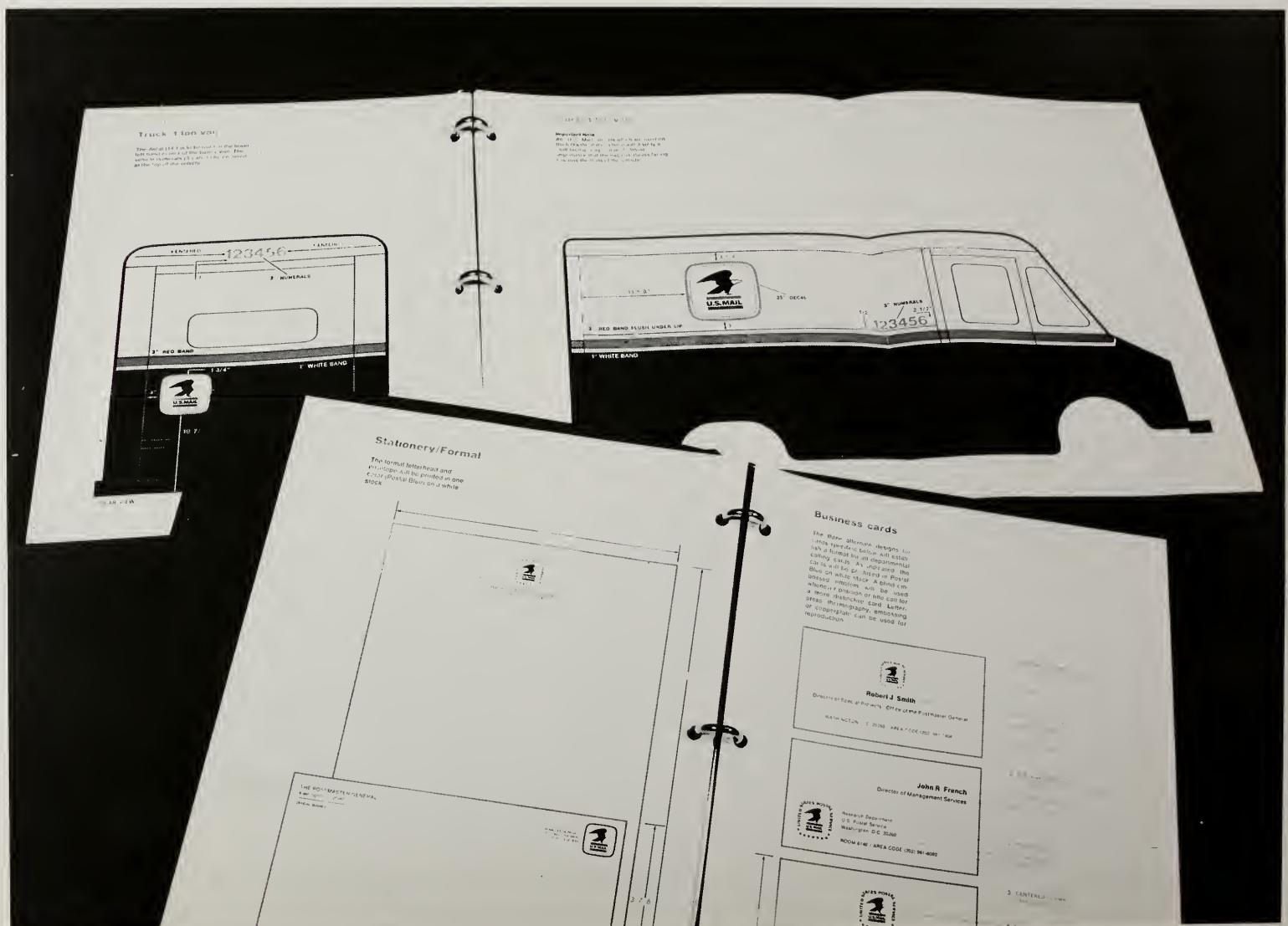
Recruiting brochures use bright but not splashy graphics to attract "kids we otherwise would never even have seen."

System is designed to save money and time by using same drawings more than once in different colors.



## Graphics Standards Manuals

**United States Postal Service Design Control Guidelines** is issued in two versions, saving money and simplifying use. Full manual goes to those with heavy design responsibility. Smaller manual provides information in less detail for general administrators.



Funding Agencies:  
(United States Postal Service  
Design Control  
Guidelines)  
United States Postal Service  
(USIA Design Manual)  
United States  
Information Agency

Designers  
(United States Postal Service  
Design Control Guidelines)  
United States Postal Service  
Creative Services,  
Vincent Hoffman, Division Manager  
Raymond Loewy/William Snaith, Inc.  
(USIA Design Manual)  
United States  
Information Agency,  
Robert Sivard, Art Director

**Identification system is applied to United States Postal Service products ranging from change-of-address forms to mail carrier's satchels.**

Design, like other media for organization, has to be directed in order to be effective. This need becomes especially conspicuous when an agency adopts a visual identity program.

With its new status as an independent establishment within the executive branch of Government, the postal service took on a new symbol. The symbol serves as the basis for new "U.S. Mail" and "United States Postal Service" emblems that are key elements in an



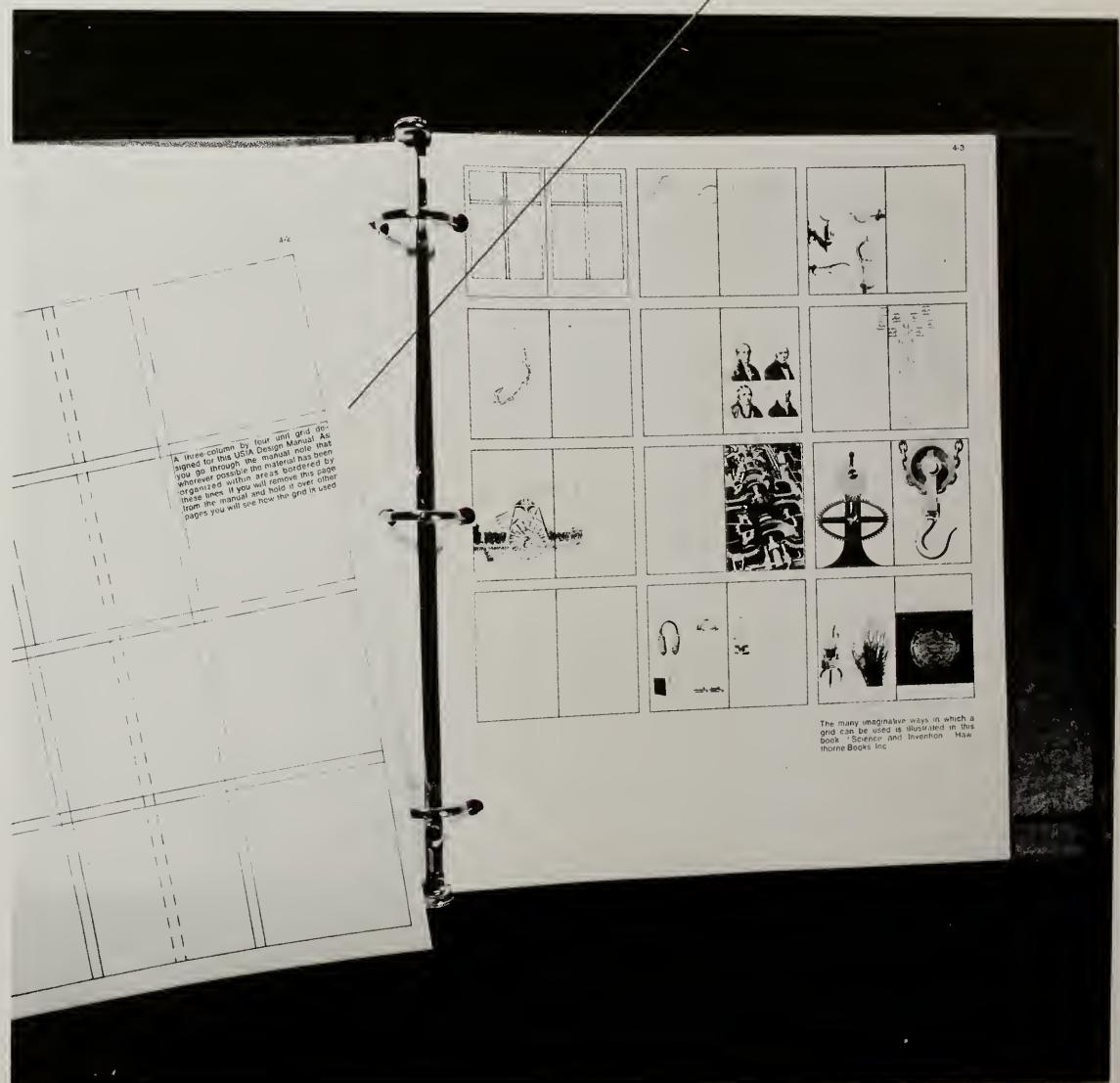
identification system for vehicles, mail boxes, stationery, printed forms, uniforms, carrier's satchels and other official paraphernalia.

To implement the identification system, and to assure its consistent use, the designers prepared a design guidelines manual. The manual demonstrates proper use of the symbols under various circumstances, much as similar graphics standards manuals do for private corporations.

The USIA Design Manual takes a different tack, for the USIA's problems and aims are different. This manual is not a prescription for correct use, but a guide to intelligent and effective performance

**USIA Design Manual enhances communication by drawing on, and explaining, a wide range of effective graphic designs from outside Government and explaining how they work.**

**Simplifies use by means of such devices as removable overlay that tells what a grid system is and shows how it works.**



**“Atoms At Work”**

Time saving and money saving structure can be erected by 12 workmen in four days. White on outside for heat reflection, it is black inside for light control.

Lecture-demonstration area, like the rest of the exhibition, uses theatrical light control to make points clear and dramatic.

Funding Agency:  
Atomic Energy Commission

Architect:  
Victor Lundy  
Planning and Coordination:  
Albert H. Woods  
Exhibit Design:  
Carlos Ramirez  
Film Production:  
Francis Thompson



Architect's two-celled form both expresses and makes feasible the dual-level nature of the exhibition. Drawing of plan shows film area, lecture-demonstration areas, and technical area which is open to public viewing.



"Atoms at Work," an exhibition on the peaceful uses of atomic energy, was sponsored by the Atomic Energy Commission. The exhibition toured for four years in Latin America and another four years in Europe and the Middle East.

In the fall of 1959 the AEC outlined its aims for an exhibition on United States progress in atomic energy. The exhibit was intended to travel to several locations in South America.

To plan and coordinate the exhibition AEC retained a designer, who then began to do research into both atomic energy and the problems of Latin America.

The AEC wanted an exhibition addressed to a large audience of the lay public and a smaller audience of scientists, technicians, and advanced students. The designer decided that, with a subject as complex as atomic energy, the only way to avoid compromise was to address the two audiences separately. He proposed a technical section of the exhibition with a separate entrance and admission by invitation. This section would include an extensive working laboratory, with United States and Latin American scientists performing cooperative experiments.

For the public section the designer outlined a film treatment of a generalized message. Film was chosen because of its possibilities for dramatic effect, because it lent

itself to presenting the gigantic physical facilities associated with atomic energy, and because it can be converted from one language to another with reasonable success.

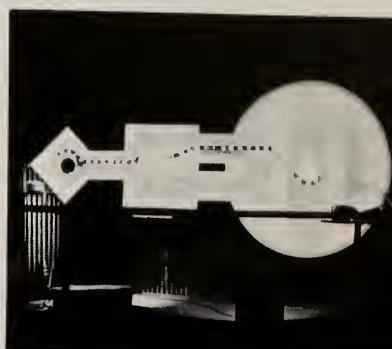
The technical area was also to be part of the show in the public area: after the introductory film, the audience would be able to watch scientists at work.

The exhibition had to move from city to city on a limited budget. These constraints indicated the use of mobile units. The project was already referred to as "The Latin American Trailer Show," and negotiations were under way to buy a number of large trailers. The designer took the assignment with the understanding that trailer purchases be delayed until he had a chance to investigate alternatives. In the process of investigating alternatives he came across a portable air-supported missile-maintenance enclosure that the Army had installed in Alabama at a cost of \$1.50 per square foot.

The architect—chosen on the basis of his ability to handle complexity in simple and visually striking ways—confirmed the feasibility of an air-supported structure. His solution, shown here, consists of two cells, one for the film and one for the technical center and public lecture-demonstrations. The two balloon shapes are slightly warped for acoustical reasons. The structure consists of two pressurized

Model traces power production from reactor vessel (circle) to heat exchanger (square) to generator (diamond).

Animated symbol for medical exhibit reveals brain, heart and thyroid gland with twinkling lights indicating radioactivity.



**Three-screen film enhances communication by treating the scale and diversity of atomic energy applications.**



skins of vinyl-coated nylon, separated by a four-foot air space. Portable walls separate the audience from the building's inner skin.

In both content and technique the film was designed especially for this exhibition. Faced with the problem of introducing the subject of atomic energy to a lay audience as arrestingly as possible, filmmaker Francis Thompson experimented with various arrangements of projection surfaces. Three adjacent screens—a format which had been used before in somewhat different ways—offered Thompson the latitude he needed to solve the problem.

The three-screen configuration proved well suited to the complexity of the subject. Clear explanation was supported by the simultaneous display of live action and animation. Motion picture footage projected next to stills helped maintain a sense of movement even though many of the important shots were of static equipment and situations.

The "visual overload" provided by three screens takes advantage of the viewer's peripheral vision, usually ignored in conventional filmmaking. The result here was the ability to emphasize the abundance of information relevant to atomic energy and to deliver as much of it as possible to large crowds as they moved through the exhibition.

**Top panel (page 25) shows two views of city; center panel shows three views of a solar observatory mirror; bottom panel uses pan shot across all three screens.**







**Interiors and  
Industrial Design**

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**The Acorn School**

New York, New York

Funding Agencies:  
Department of Housing  
and Urban Development  
Phipps Houses

Architects:  
Mayers & Schiff



**Design of community school on the ground floor of an apartment building is responsive to needs of parents, teachers, and above all children, some of whom made drawings of what they wanted the school to be like.**

The Acorn School was built in "found" space on the ground floor of a New York City high-rise apartment building financed with FHA funds and a bank loan.

If there is one American institution that has been roundly condemned in our time, it is the school. The epithet "joyless," given currency by a popular book on the subject, has been applied to classrooms across the nation.

The Acorn School is anything but joyless, and it is located in a city where the schools are considered by many to be the embodiment of everything wrong with education in America.

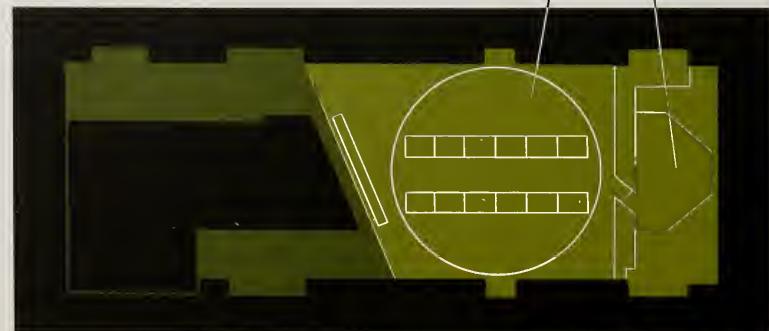
Acorn, of course, is not a public school, and it is not situated in a conventional school building, but in an area that the builders had intended for doctors and dentists. But there is no reason that public schools cannot be located in found space. That possibility has become attractive to administrators lately as an alternative to the imperson-

ality of large schools and the amounts of money and time required to build them.

In addition to economy (it is generally cheaper to rehabilitate existing spaces in already sound structures than to build new ones), found space has certain educational advantages. Instead of segregating the educational process, it integrates formal education into other aspects of daily life. And the environmental excitement of found space is likely to exceed that of a standard classroom building.

But Acorn is interesting less because of where it is than because of what the designers did there.

Performance goals were not difficult to set. Acorn is a parent-owned community school, loosely Montessori in philosophy. It consists of an upper school for ages 5 to 11 and a lower school of nursery and kindergarten. The upper school was programmed for an open classroom, and children are encouraged to mix, irrespective of



**Hospital cubicle track is suspended from the ceiling in a circle seven feet above the floor. Fabric dividers hang from the track and can be swung in front of study carrels to form private spaces. Service ducts are labeled to say what they are.**

**"Found" space is complemented by "found" interior components ordered right out of catalog. Urethane carts equipped with projectors are wheeled up to carrels made of scaffolding, and slides are projected on back of shelving.**



ages, according to their own interests. So as much equipment as possible had to be designed for use by children of various sizes and sophistication and with varying degrees of coordination.

The openness of the classroom space had somehow to be made compatible with the need for privacy and intimacy (several of the children prepared sketches for the architect, and these tended to stress nooks, niches, crevices, treehouses and similar warm, private retreats).

Since Acorn is owned by middle-class parents, there were severe budgetary restrictions to the project. The designers avoided the expense of a dropped ceiling. They left all ceiling pipes and ducts exposed for reasons of economy, and also to enliven the appearance. Some of those components are labeled with vinyl lettering, making children aware of mechanical features of a building that are usually hidden. The block walls are covered with "self-healing" vinyl that closes over holes when tacks and pushpins are removed.

The design solution is colorful, low-cost and extremely flexible. The basic design element is a collection of standard builder's scaffolds, each fitted out for specific functions: storage areas, book nooks, dens, study carrels, theater areas. The scaffolding modules roll wherever the kids want to roll

them. When combined with movable urethane projection carts the scaffolds become mini-theaters.

What is so special about the scaffolding, of course, is that it is not special at all. Other right-out-of-the-catalog items include hospital cubicle track suspended from the ceiling, clamp-on spotlights for the scaffolding modules, dock lights, and plastic industrial storage bins mounted on rails along the



walls. The marked electric raceways increase flexibility, permitting lights, audio visual devices, and other electrical equipment to be plugged in anywhere.

**Lower school is lit by truckers loading-dock lights. Carpeted stairs are used as story-telling area or stage. Alphabetical plastic bins can be removed for washing. Basic module for the media area is standard aluminum builders scaffolding.**



Lighting is variable, and for the most part the kids vary it themselves. Pipe-mounted spots and truck dock lights are on dimmers, and each scaffold module has its own clip-on incandescent spots.

According to architects Mayers and Schiff the total cost of the project (for which they selected or designed all furnishings) was \$108,000, which comes to \$20 per square foot and \$1,000 per student. New York City's present going rate for school construction and furnishing is between \$50 and \$60 per square foot and between \$5,000 and \$7,000 per student.

The imaginative response to constraints of space and money, the incorporation of the client's objectives into the solution, and above all the concern for the users make Acorn School an unusually good example of design performance.



**Space Planning and Interior Design Study for the Operations Control Center Building for the Washington Metropolitan Area Transit Authority**

Washington, D.C.

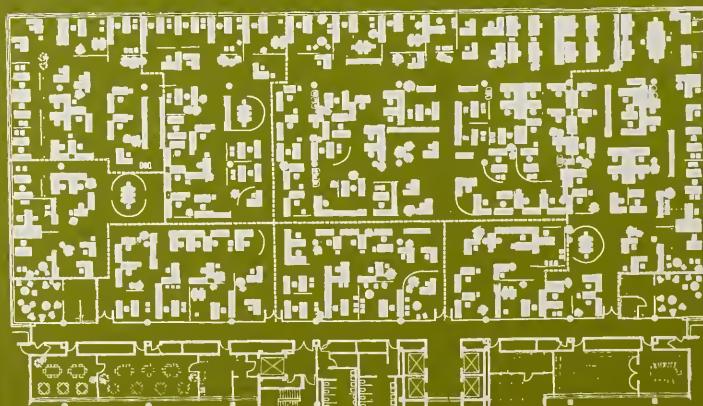
Funding Agency:  
Washington Metropolitan Area Transit Authority

Architects and Planners:  
Keyes, Lethbridge and Condon

**Architects conducted a comparative study of open planning versus conventional offices and made comparative drawings of furnishings and other features.**



Conventional



Open

**Problem:** Offices for the Washington Metropolitan Area Transit Authority (WMATA) have to be adaptable to a new and constantly changing organization.

**Solution:** Architects Keyes, Lethbridge and Condon based their space planning and interior design program on a study of open versus conventional office planning.

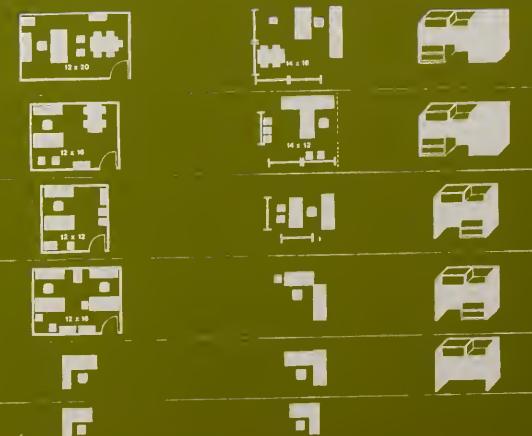
WMATA was set up to plan, develop and operate the capital's subway system, now under construction. Recently it has been charged with the responsibility of operating the bus system as well.

That indicates the kind of organization WMATA is: one that has already changed and will change even more as the subway is com-

**Open and conventional work stations for various employee functions are compared.**

pleted and the responsibility shifts from building a subway system to running and maintaining one.

Early in the study pictured here, the designers were convinced that open planning was indicated, primarily because flexibility was so important. Open layouts could be rearranged with minimal disruption and—especially important—were more likely to be. Landscaped offices, the designers discovered, were moved more often to increase or maintain efficiency because the moves could be made handily during off hours. Conventional offices, on the other hand, discouraged moves and changes because of the disruption they caused, and encouraged making do with ineffi-



Charts, comparing partitioning systems and furnishings, indicate open layouts can be moved five times as often for half the cost.

cient arrangements.

Circulation routes in open space are also less rigid and easily redefined as needs change.

The lower maintenance costs of open planning were just as impressive as the convenience and efficiency advantages.

The open office, however, is not without disadvantages. Chief among them is the absence of privacy and quiet.

Carpeting, acoustical ceilings, and sound-absorbent dividers make the space acoustically workable, though open. The effect is supported by "masking sound."

Work stations (the open layout counterpart of offices and desks) are kept apart visually by divider screens, storage units, and plants.

After developing space and equipment standards for each employee function, designers made detailed evaluations of open versus conventional plans, excluding items common to both plans, such as carpeting, window treatment, standard desks, chairs, and tables.

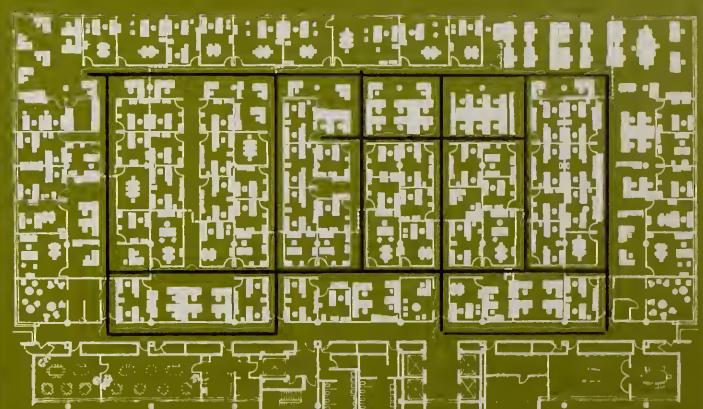
Because WMATA's space needs are expected to keep changing rapidly over a ten-year period, cost estimates were projected for ten years. While the initial cost of a conventional office plan was estimated to be approximately 15 percent less than in the open plan, the latter could be moved five times as much for half the cost and could be maintained for 20 percent less.

Conventional layout is shown to require rigid circulation patterns, while open layout permits traffic flexibility.

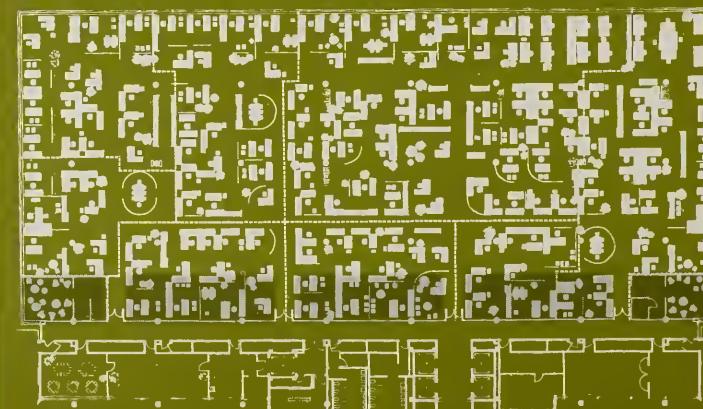
WMATA is adopting a modified version of open planning, with conventional offices in the central core and open-plan work stations along the windows.



Conventional



Conventional



Open



Open

### Laboratory Outfitting for The Salk Institute for Biological Studies

San Diego, California

Funding Agencies:  
Department of Health, Education  
and Welfare,  
National Institutes of Health  
The National Foundation  
The Avalon Foundation  
Eli Lilly & Co.  
Kettering Fund

Architect:  
Louis I. Kahn  
Laboratory Consultants:  
Earl L. Walls Associates



The Salk Institute of Biological Studies in San Diego, California, is housed in a new but already widely known building designed by Louis I. Kahn. The laboratory interiors shown here reveal something of what the designer can contribute to science: interiors and equipment reliably adaptable to the performance of varied tasks.

Even if interior work spaces are badly designed, work does get done in them. It may suffer in quality and in quantity, and the worker may suffer physically and mentally. But rarely is the organization or the employee totally prevented from performing tasks.

That becomes less true as work becomes more highly specialized. Perhaps the most highly specialized work of all is performed by scientists. The equipment they use has to work or they can't.

The very nature of science imposes another requirement on equipment: extreme adaptability. An assembly-line worker may perform a very highly specialized task —so highly specialized that it must be performed in precisely the same way over and over again. If he does it differently he will lose his job. With a scientist it is just the opposite. His job is discovery, and discovery keeps changing the job.

The Salk Institute of Biological Studies is conceived of as a place conducive to scientific creativity. That is what it and the new building

**Modular systems approach permits open or enclosed laboratory interiors in new building, recognizing importance of adaptability. Simplifies use, saves time.**

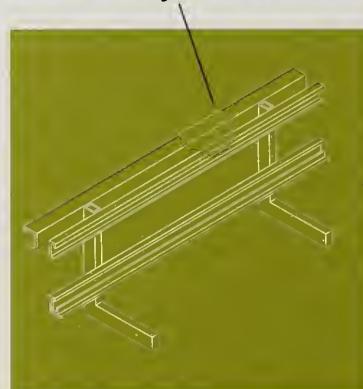
that houses it are for.

The laboratory equipment is as new as the building for which it is designed. Its design began with an analysis of the needs of biological researchers. Some work is better performed under private or semi-private conditions; some work requires constant access to colleagues. It was particularly important to define the relation of the researchers to each other and to the equipment and apparatus they would be working with.

Each person's "thinking and working area" (in other words, his desk) was placed between his laboratory space and the window wall, enabling him to relate either to the laboratory or to the view outside. This option made it necessary to find ways—either by desk placement or draperies—to permit the researcher to "turn off" the outside environment. When that could not be done, according to the designer, "we found a considerable presence of aluminum foil or poster applications on the window wall."

Toward the center of the laboratory is each researcher's personal laboratory-work area, usually the laboratory bench. In the center of the space the designers placed enclosures—such as warm rooms, cold rooms, dark rooms, instrument rooms, centrifuge rooms—that relate equally well to both sides of the laboratory. These unenclosed storage spaces make a

**Simplifies maintenance: basic support spline from which cabinets are hung affords plumbers and electricians easy access.**



**Casework is off the floor for access and maintenance ease. Drawers are removable fiberglass trays that can be placed in an autoclave.**



**"Interior Design in Manned  
Spacecraft or Space  
Stations—Literature Search  
#20724"**

Funding Agency:  
National Aeronautics and Space  
Administration Scientific and  
Technical Information Office,  
NASA Headquarters,  
Washington, D.C.

**This computer read-out on  
interior design standards is  
a design dividend of the  
Apollo program.  
Space research spinoffs  
such as this are being made  
increasingly accessible  
through NASA's Technology  
Utilization Program.**

<p>G LONG DURATION SPACE STATION SIMULATION TEST) A/MC LEAN, M. V.; BYSEMAN, J. S.; C/SINGER, R. V.; MCDONNELL-DOUGLAS ASTRONAUTICS CO., HUNTINGTON B. FACH, CALIF. AVAIL. NTIS</p>	<p>IN NASA, LANGLEY RES. CENTER PRELIM. RESULTS FROM AN OPERATIONAL 90-DAY MANNED TEST OF A REGENE- RATIVE LIFE SUPPORT SYSTEM 1971 P 393-414 /SEE N 71-20951 10-05/ /*HABITABILITY/HUMAN REACTIONS/*LONG TERM EFFE- CTS/*SPACE STATIONS/CONFERENCE/HUMAN FACTORS FN GINEERING/ SPACE ENVIRONMENT SIMULATION/ SPACECREW S</p>	<p>N71-20980# ISSUE 10 PAGE 1508 CATEGORY 5 71/00/00 13 PAGES UNCLASSIFIED DOCUMENT BEHAVIORAL PROGRAM LONG DURATION CONFINEMENT EFFECTS ON CREW BEHAV- IOR DURING MANNED SPACE FLIGHT SIMULATION A/MC LEAN, M. V.; BYSEMAN, J. S. MCDONNELL-DOUGLAS ASTRONAUTICS CO., HUNTINGTON B. FACH, CALIF. AVAIL. NTIS</p> <p>IN NASA, LANGLEY RES. CENTER PRELIM. RESULTS FROM AN OPERATIONAL 90-DAY MANNED TEST OF A REGENE- RATIVE LIFE SUPPORT SYSTEM 1971 P 363-375 /SEE N 71-20951 10-05/ /*CONFINEMENT/*SPACECREW/ SPACECRAFT CABIN SIMULATORS/*SPACECREW/ ASTRONAUT PERFORMANCE/ CO- NFERENCES/ HUMAN FACTORS ENGINEERING/ LONG TERM FF EFFECTS/ MANNED SPACE FLIGHT</p>	<p>N70-41467# ISSUE 23 PAGE 4263 CATEGORY 5 NASA-CR-102830 0-6-VOL-3 NAS8-30172 70/05 /00 121 PAGES UNCLASSIFIED DOCUMENT USE OF THE BEN FRANKLIN SUBMERSIBLE AS A SPACE S- TATION ANALOG, VOLUME 3 - HABITABILITY FINAL REP ORT</p> <p>LONG TERM HABITABILITY ANALYSIS OF BEN FRANKLIN SUBMERSIBLE INCLUDING FOOD, WATER, ENVIRONMENT, C- LOTHING AND BEDDING, AND PERSONAL HYGIENE GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y. AVAIL. NTIS</p>	<p>/*CLOSED ECOLOGICAL SYSTEMS/*ENVIRONMENTS/*HABI- TABILITY/*SPACE STATIONS/*SUBMARINES/ BEDDING EQUI- PMENT/ CLOTHING/ FOOD/ HUMAN FACTORS ENGINEERING/ HYGIENE/ WATER MANAGEMENT</p>	<p>PAGE 25 ITEMS 65- 67 OF 931</p>	<p>N70-41463# ISSUE 23 PAGE 4262 CATEGORY 5 NASA-CR-102828 0-6-VOL-1 NAS8-30172 70/05 /00 54 PAGES UNCLASSIFIED DOCUMENT USE OF THE BEN FRANKLIN SUBMERSIBLE AS A SPACE S- TATION ANALOG. VOLUME 1 - SUMMARY TECHNICAL REPORT FINAL REPORT (BEN FRANKLIN SUBMERSIBLE USE AS SPACE STATION A- NALOG) GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y. AVAIL. NTIS</p> <p>/*ANALOGS/*CLOSED ECOLOGICAL SYSTEMS/*SPACE STA- TIONS/*SUBMARINES/ HABITABILITY/ MAINTAINABILITY/ MICROBIOLOGY/ NASA PROGRAMS/ OCEANOGRAPHY/ PHYSIOL- OGICAL EFFECTS/ PSYCHOLOGICAL EFFECTS</p> <p>N69-21843# ISSUE 10 PAGE 1639 CATEGORY 5 A D-681457 AFRL-TR-68-24 68/08/00 153 PAGES UNC CLASSIFIED DOCUMENT CLEARANCE AND PERFORMANCE VALUES FOR THE BARE-HA- NDED AND THE PRESSURE-GLOVED GLOVE</p>
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Ects, AND WORK-REST CYCLE  
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IN ITS COMPENDIUM OF HUMAN RESPONSES TO THE AFR  
SPACE ENVIRON., NOV. 1968 /SEF N69-12592 02-04/  
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ET, AND ANTHROPOMETRY)  
A/ROTH, F. M. (A/ROTH, F. M.)

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(VISIBLE AND ULTRAVIOLET LIGHT ENVIRONMENT AS RE  
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A/FINKELSTEIN, S.; B/ROTH, E. M.  
LOVELACE FOUNDATION FOR MEDICAL EDUCATION AND RE  
SEARCH, ALBUQUERQUE, N.MEX. AVAIL. NTIS  
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PROPERTIES/ SKIN (ANATOMY)/\*SPACE SUITS/ SPACERCraf  
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SEARCH, ALBUQUERQUE, N.MEX. AVAIL. NTIS  
WASHINGTON NASA  
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N MACHINE SYSTEMS

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HUMAN-FACTOR'S ASPECTS OF ORBITAL OPERATIONS  
(HUMAN FACTOR'S REQUIREMENTS FOR MANNED SPACE LAB  
ORATORY ORBITAL OPERATIONS)  
A/FRASER, T. M.  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, L  
ANGLEY A.  
ANCHEE DEDICATED LANGLEY STATION

Six regional dissemination  
centers operated by universi  
ties and research institutes  
serve fee-paying clients.

NASA's vast library of data  
and techniques applicable  
to private industry includes  
some 750,000 NASA tech  
nical documents. They and  
others have been abstracted,  
indexed and computerized  
and are updated every two  
weeks.

## Morgantown Personal Rapid Transit System

Morgantown, West Virginia

Funding Agency:  
Department of Transportation,  
Urban Mass Transportation  
Administration

Prime Contractor:  
The Boeing Company



**Performance goal: to demonstrate that a personal rapid transit system under automated control is feasible for meeting urban community transit needs. A system carrying between 5000 and 8000 passengers per hour would be equivalent to four-to-six lane highway.**

**System will operate on schedule during peak periods, on demand during slack periods. Vehicle size, small for mass transit, was selected for economical service during both periods.**

The vehicle shown below does not really look unfamiliar. Even though you have never seen one, you have been seeing pictures of similar vehicles for the past twenty-five years. Those were renderings or models. This one is a prototype and represents the Urban Mass Transportation Administration's effort to address problems of mass transportation now, an effort already visible in San Francisco's BART system.

This car is part of the Morgantown Personal Rapid Transit System implemented in Morgantown, West Virginia, under UMTA's Research, Development and Demonstration Program.

Begun in 1972 and scheduled for revenue operations in fiscal 1975, the Morgantown project is designed to uncover and help solve typical problems that a PRT system would face in other cities.

UMTA funded a 1969 feasibility study recommending a fully automated system along fixed guideways. UMTA then funded follow-up research and development, with Morgantown becoming a kind of vehicular model city.

Morgantown is the home of the three-campus University of West Virginia, where at each class break some 1100 students depend on 17 buses to carry them between campuses. The PRT route connects two of the campuses with the business district of Morgantown. When com-

pleted, the system will use some 75 cars running between six stations along the guideway.

The city's terrain precludes pedestrian or bicycle paths for long distances. There is a feeling that most basic transportation problems are represented here.

As with Dulles Airport (page 52), the problems called for more than the mere improvement of existing facilities. Something truly new had to be tried. The PRT system is "personal" because, unlike other rapid transit systems, it is more like a car than like a train or bus: it comes when you call it.

The vehicle not only comes when a passenger wants it to, it goes where he wants it to, as a self-service elevator does.

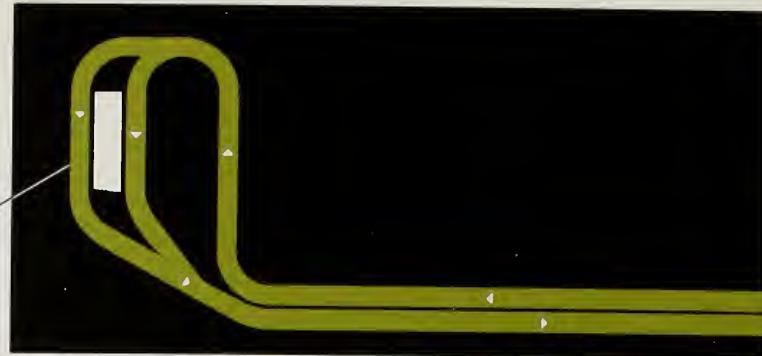
Each vehicle can carry 21 passengers, eight seated and 13 standing. The cars are 15½ feet long, six feet wide, weigh about 8,000 pounds when empty and run at a top speed of 30 miles per hour.

A computer system operates PRT through the interaction of central control, station control and vehicle control.

The PRT passenger will press a button to indicate where he wants to go. The system will then signal which car will take him there, and that car will automatically enter the guideway system in the first available time slot.

The basic conceptual problem was to design a public transporta-

Three off-line stations with multiple boarding slots connect two West Virginia University campuses with Morgantown's business district.



Cars run along elevated concrete guideway (shown at left and in cross section below) with power and steering rails along sides.

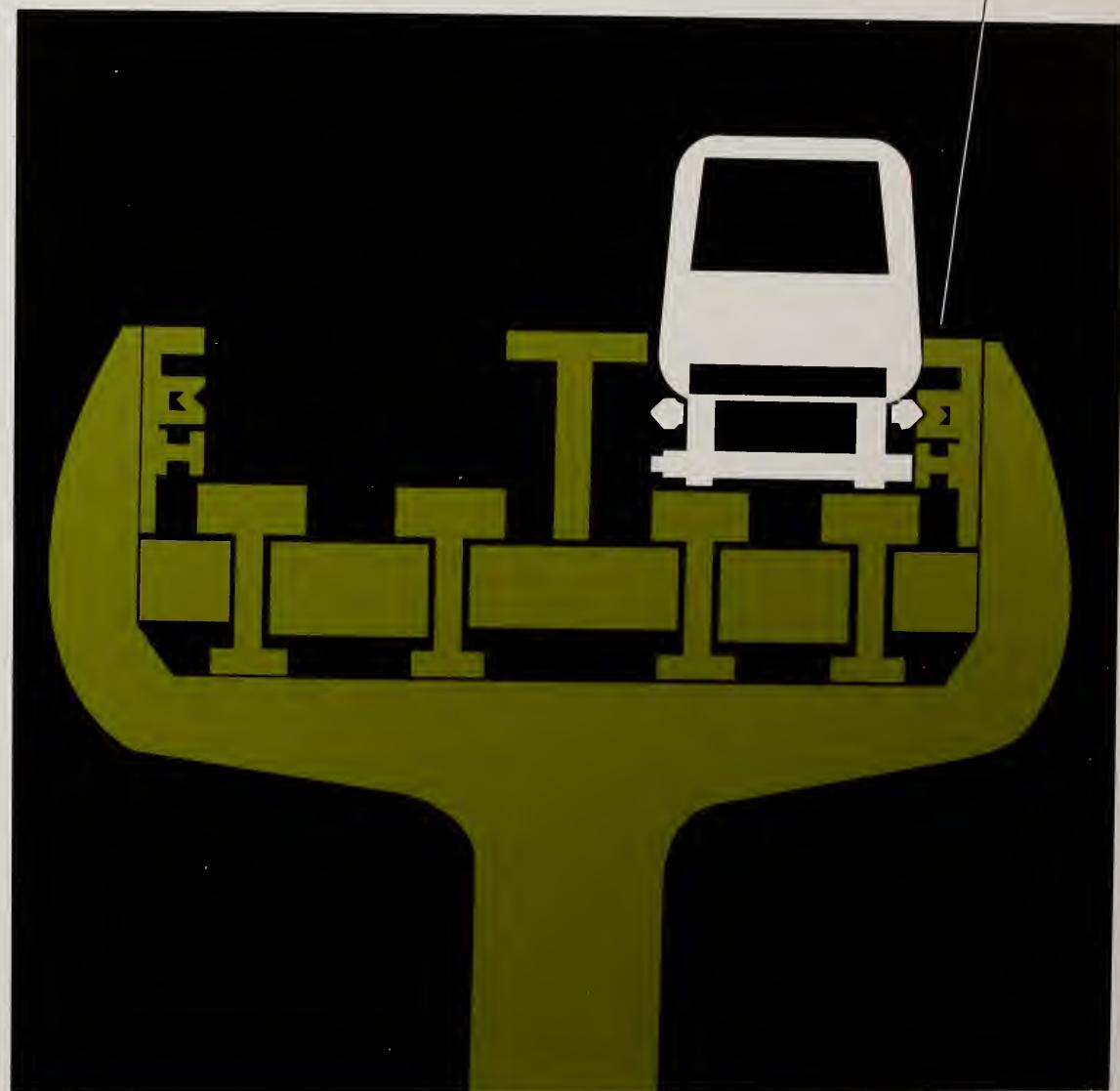


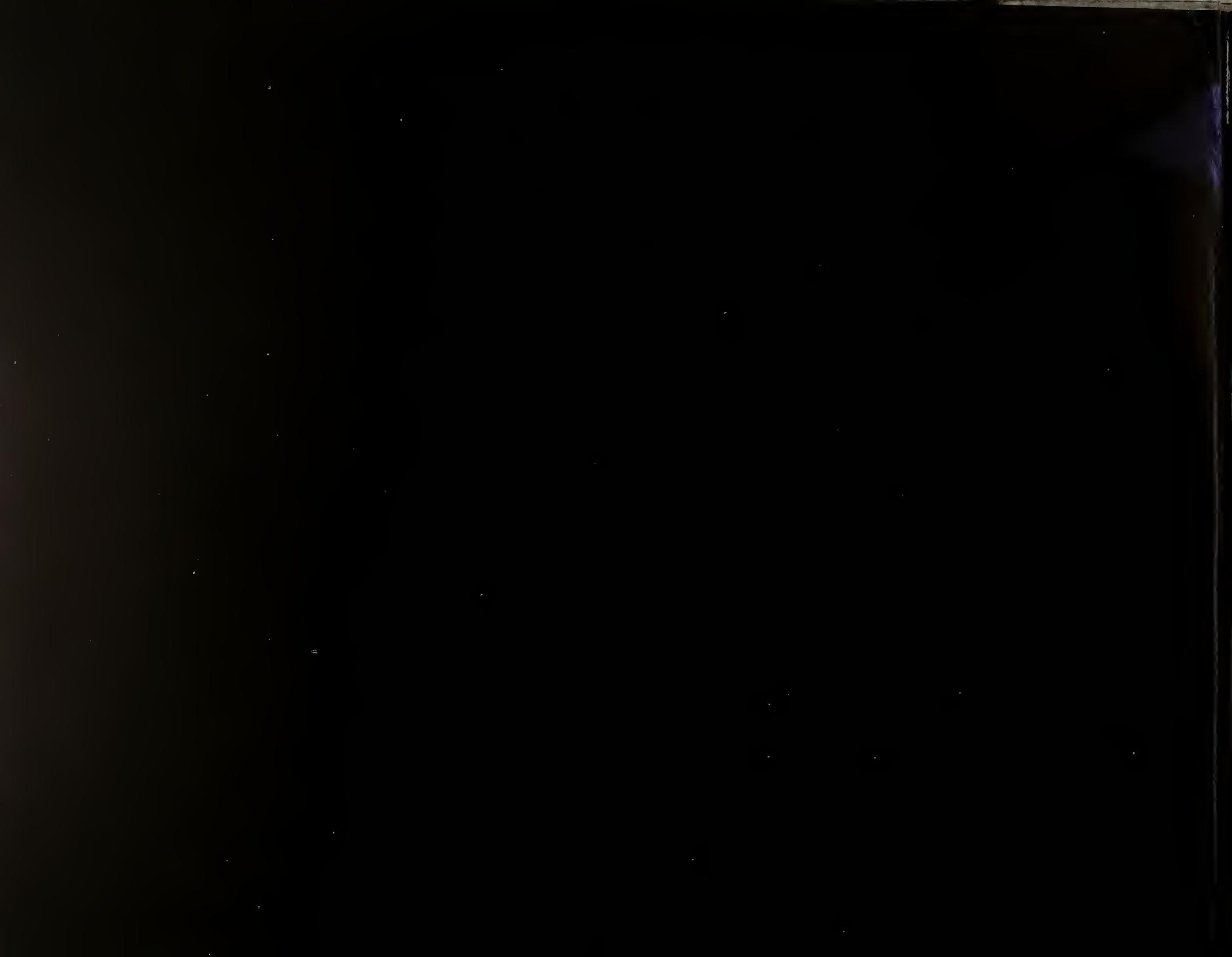
tion system that would have the flexibility of autos without the attendant pollution and congestion, and without the delays of buses and subways. Intrinsic to the system is the concept of the vehicle's attending the passenger instead of the passenger's waiting until the vehicle comes along. To be economically feasible, particularly during nonpeak hours, this concept demands a driverless vehicle. And a vehicle without a driver is a vehicle that cannot be permitted to mix with others in traffic, so a guideway is necessary.

Another way in which PRT vehicles are more like autos than traditional public transportation is that the vehicles, rather than the track system, do the turning. Rub-

ber guidewheels running on a vertical steering rail are electronically directed to left or right at each junction. The small, driverless vehicles are being developed in several alternate models, all fully automated and all self-switching.

In the Morgantown project UMTA is developing a full-scale operating system to explore the role of technology in addressing mass transit problems. The project's significance lies in its applicability to the nation's urban transportation needs. "The goal," according to an UMTA official, is "to make this new system eligible for UMTA's capital grants program throughout the nation and to make the design available to all qualified parties on a nonproprietary basis."





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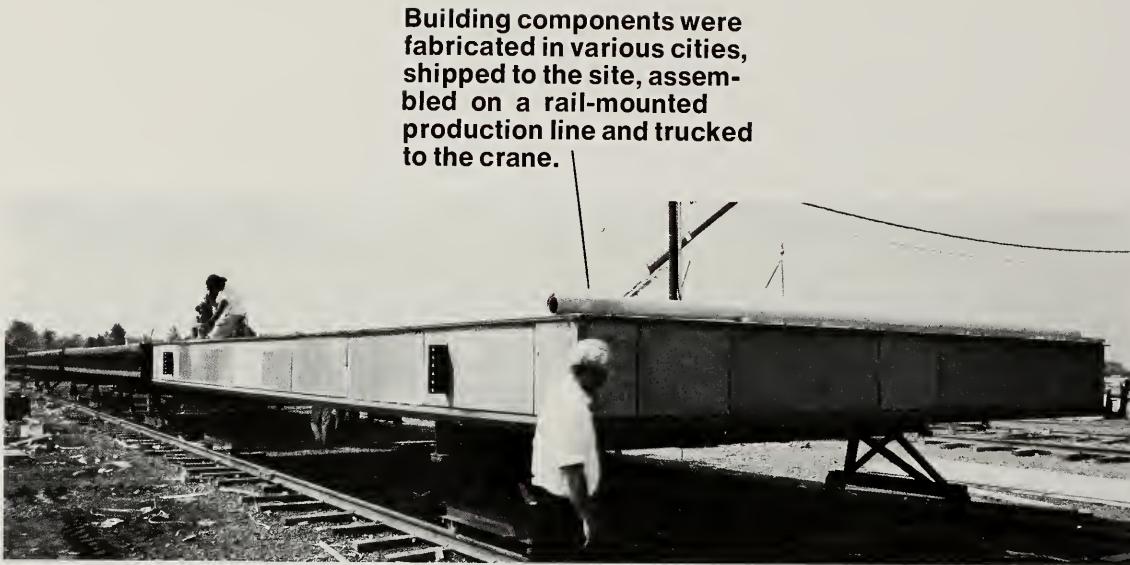
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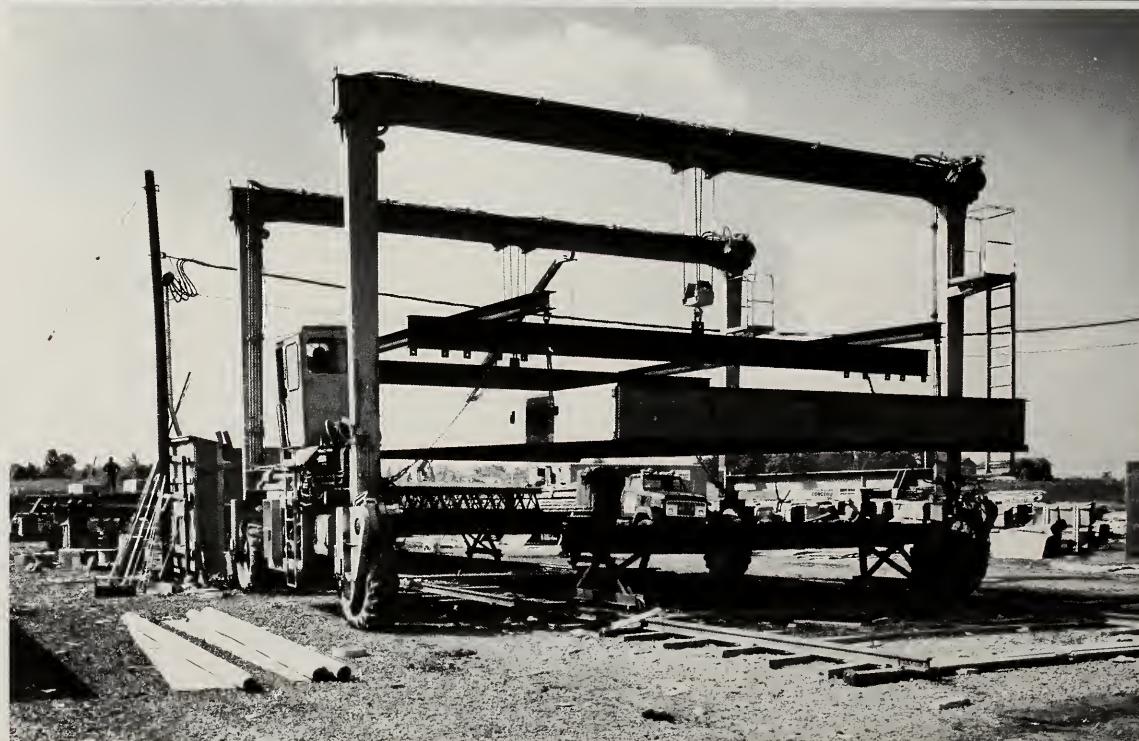
**Student Housing  
State University College  
at Brockport**

Brockport, New York



Funding Agencies:  
Department of Housing  
and Urban Development  
Dormitory Authority of  
the State of New York

Design/Build Team:  
Caudill Rowlett Scott, Architects  
M. Paul Friedberg & Associates,  
Landscape Architects  
The Engineers Collaborative  
W. E. O'Neill Construction Co.



In April 1972, the ground breaking took place for student housing on the Brockport campus of the State University of New York. Due to the efficient and rapid life-cycle costing methods of the Design/Build System, these dormitories were available for  $\frac{1}{4}$  occupancy by January 1973. Design/Build is one of many advanced industrial technology building systems sponsored by the Federal Government.

We live in a nation and an age characterized by mass production and industrial systems. Yet we have rarely exploited the potential of industrial systems in architecture. The cause is probably a blend of psychological resistance, professional resistance, and ignorance. "Systems" run counter to the image of the architect as giver of form, though they needn't do so. "Systems" are sometimes held up as examples of the brutalizing effect of industry, although they needn't be.

What brought systems construction to the Brockport campus of the State University of New York was the same urgent need discernible at campuses both private and public across the country: student housing is becoming less satisfactory as it becomes more costly.

The design emerged from an imaginative exercise in bidding and evaluation for construction contracting. New York State's Dormitory Authority eliminated price

**Dormitory area is designed as an apartment complex organized to accommodate students, trees, walkways. This project goal was found to be perfectly compatible with a systems approach to construction.**

as a bidding factor by specifying \$5,825,000 for the project. (This comes to \$5,825 per bed as compared to the average of \$8,300 per bed the Dormitory Authority had been paying for dormitories.) An elaborate evaluation system weighed each element on its merits, with extra points for merit in areas of special importance to the Dormitory Authority and consulting teams. Acting as consultants in the evaluation system were four teams of architects, engineers, interior designers, students, faculty and staff.

The result is Design/Build—a French building system adapted by

American architects, landscape architects, and engineers.

Design/Build has been described as "a series of procedures that make building erection more efficient." Components are assembled on-site on a rail-mounted production line, then lifted into place. Columns are bolted to the foundation, to which trays are attached accommodating all wiring, piping, and ducts.

Completed 18 months after planning, as compared with the 30 to 48 months normally required, Design/Build is a successful experiment in the turnkey approach to dormitory project delivery.



**Lightweight, factory-made framing panels are hoisted into place by crane, fully assembled.**



**St. Francis Square  
Housing Project**

San Francisco, California

Funding Agencies:  
Department of Housing  
and Urban Development  
Joint Pension Fund,  
International  
Longshoremen's & Warehousemen's  
Union, Pacific Maritime Association

Architects:  
Marquis & Stoller  
Landscape Architects:  
Lawrence Halprin & Associates





**Low rise housing complex with no through streets uses generous landscaping to create safe, well maintained environment.**

St. Francis Square is a moderate-to low-income housing project in San Francisco, financed under Section 221(d)(3) of the U.S. Housing Code in 1962 and completed in 1964. It consists of 299 garden apartments, most of them with two or three bedrooms.

Unusually well maintained by the people who live there, the housing project is characterized by a high occupancy and by a low crime rate in a high crime area.

Because there are no through streets, small children are able to go out of doors unattended and nonresidents are discouraged from using the public facilities. The sense of community is enhanced by the fact that the buildings are all turned inward, so that all living rooms face interior open space. This also strengthens both physical and psychological security.

By arranging the buildings in three separate rectangles around distinct interior courts the designers laid the framework for sub-communities. Each court has both service and play facilities serving about 100 families.

Landscaping is generous, attracting residents to the outdoor spaces and providing the visual continuity important to the concept of a single community.

That St. Francis Square works and the precise extent to which it works are well established by an intensive study made from 1967 to 1971 by Clare Cooper and Phyllis Hackett of the Center of Planning and Development Research at the University of California, Berkeley. The study, supported in part by U.S. Department of Health grants, consisted of two analyses, from which the material here is drawn.



**Environment "welcomes" children by eliminating traffic hazards, providing grassy surfaces. Semi-mature trees were specified because they had a better chance to survive child's play.**





**Eight years later the St. Francis Square project still has a waiting list for apartments, is still in excellent shape, is still enjoyed.**

**Children at St. Francis can move safely to play areas throughout the project. Apartment balconies have in some cases been glassed in by tenants to create an extra room. (Opposite)**

The first analyzed design decisions, and the second surveyed resident satisfaction. Then the researchers put the two together to see whether the design decisions were justified by the results.

Probably the most important design decision was to focus attention on the project as a whole rather than on individual apartments or buildings. In general, this was unquestionably the right decision although it led to some errors in detail: insufficient storage space,



kitchens too small to eat in. Yet the architect's decision to emphasize the whole rather than the individual apartments contributes to an architectural strength that is invulnerable to patio screens and other details that tenants contribute.

One design objective was to provide an alternative to suburbs for middle-income families. Three-quarters of the residents of St.

Francis Square are middle-income, and one reason is that the environment "welcomes" children.

The emphasis on the project environment, rather than on the individual units, is reflected in the fact that more than 90 percent of the residents attribute much of their satisfaction with St. Francis Square to the outdoor areas. Seventy percent of the residents rate the landscaping as "very important." When asked which they would choose if given a choice between trees or a larger living room, trees or a larger kitchen, etc., more than 60 percent of the tenants said they would choose trees.

Because St. Francis Square is located in what had been a relatively high crime area, it is particularly interesting that it meets the standards of "Defensible Space" in Oscar Newman's book of that title. St. Francis Square, Newman says, "answers almost all of the requirements of defensible space design: It defines territorial areas and paths of transition from public to private; it provides for easy and natural surveillance of public areas; communal amenities are located in public areas to create a casual association that defends commonly shared pursuits and focuses surveillance; the number of families sharing an entry is limited to six; and finally, the image of the project is that of a single-family row-house development."



### **Everett McKinley Dirksen Building**

Chicago, Illinois

Funding Agency:  
Public Buildings Service  
Government Services  
Administration

Architects and Engineers:  
Schmidt Garden & Erikson  
The Office of Mies van der Rohe  
D. F. Murphy Associates  
A. Epstein & Sons, Inc.

**An essential public service:  
Federal courthouse and  
office building provides  
swift elevator access to  
courtrooms and large office  
areas adaptable to various  
Federal agency functions.**



The 30-story Everett McKinley Dirksen Building is a courthouse and Federal office building finished in 1965, as Phase I of the Chicago Federal Center. Construction for the two other buildings which will complete the complex was begun in the summer of 1971. The goal was to create a "total Government center which could become a model for other Government projects throughout the country."

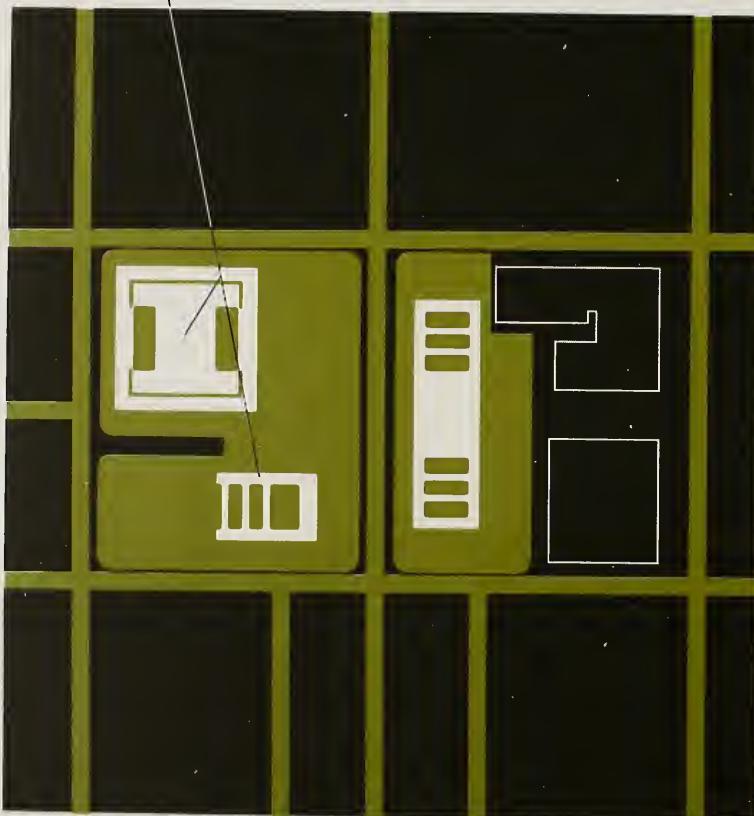
A courthouse is a structure in which certain patterns of communication are predictable. Walter H. Sobel, Chairman of the American Institute of Architects' Task Force on Courtroom Facilities, has isolated four types of communication



in any courtroom: "Visual, audio, movement of people and document transfer."

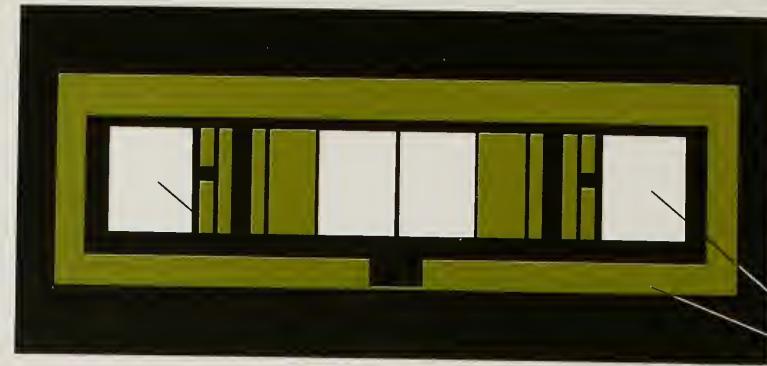
These categories of communication involve specific roles: judge, lawyers, clients, bailiff, press, spectators, witness, court reporter, jurors, clerk, police officers, social

Courthouse and office building are part of complex that will include another Federal office building and a one-story Post Office.



workers, etc. Any design of a Federal courtroom should be based on a study of how these people actually relate to each other and of the distinct physical requirements of private and public communication.

A courtroom so designed won't make trial by jury a pleasurable experience. But it can help make it an efficient one, with concerned parties able to see and hear each



Courtrrooms are embraced by general purpose office space.



other without strain.

The prime determining factor of the size of floors in the Everett McKinley Dirksen Building was the size of the courtrooms and the amount of space required for easy elevator access to them. To make the courtrooms as accessible as possible, elevators were placed in two main cores, each located between twin courtrooms.

### Old Buildings Restored

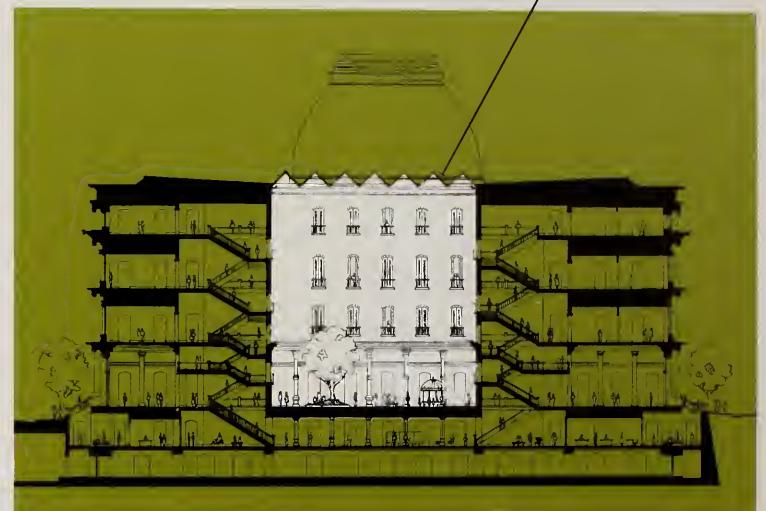
The Patent Office building in Washington, D.C. has been transformed for radically different use: to house The National Collection of Fine Arts and The National Portrait Gallery.



Funding Agencies:  
(The National Collection of Fine Arts and  
The National Portrait Gallery)  
Smithsonian Institution  
(Old St. Louis Post Office)  
Public Buildings Service  
Government Services Administration  
(Renwick Gallery)  
Smithsonian Institution

Designers:  
(The National Collection of Fine Arts and  
The National Portrait Gallery)  
Faulkner, Stenhouse,  
Fryer & Faulkner  
(Old St. Louis Post Office)  
Peckham-Guyton, Incorporated  
(Renwick Gallery)  
John Carl Warnecke and Associates  
Hugh Newell Jacobsen & Associates

St. Louis's Old Post Office combines the solidity of a fortress, including underground tunnels and a 25-foot moat, with the elegance of grand staircases, Venetian curved fireplaces, vaulted ceilings. Plans for commercial redevelopment include construction of a 6,000-square-foot skylight over the existing courtyard.



**The Renwick Gallery in Washington, D.C. was built in 1858 as the first Corcoran Gallery of Art. It has been restored to serve as the Smithsonian Institution's museum of design, crafts and decorative arts.**

Most of the case studies in this book are examples of some kind of innovation. The three buildings presented here are also innovative in the use of materials and techniques. They are not directed toward the solution of new problems, however, but rather toward the preservation of traditional values. They show the role of design in saving the past. And the past is one of our most important resources for the future.

Government is the logical agency for preserving these values. General Services Administration, the Department of the Interior, and the Department of Housing and Urban Development are the Federal agencies that have been most influential in funding restoration.

The National Collection of Fine Arts and the National Portrait Gallery are housed in the old Patent Office Building, which had been scheduled for demolition in the fifties. The General Services Administration, which had planned to do away with the building in order to create space for a parking lot, responded to public and private pressures in favor of saving the structure.

At the time restoration began the original interior design was largely hidden behind partitions, many of which were removed in the restoration process.

The restored building is one of the major recent tourist attractions



in Washington's downtown urban renewal area.

The Renwick Gallery, National Collection of Fine Arts, opened in 1971 after a sustained public controversy in the sixties about whether it should be torn down in favor of a park. A feasibility study by the designers concluded that the gallery could reasonably be restored to its original function, although the effect of weather extremes on the building's intricate structure had left 90 percent of its ornamental work in ruins. Even after the facade was cleaned, experts were unable to make out many of the original motifs. A search through Library of Congress records and other old files yielded the original 19th century architectural specifications and a number of Matthew Brady photographs. When the photographs were blown

up, considerable detailing was visible—roundels, garlands, festoons, keystones, capitals—and could be authentically restored.

In 1880, when the old Post Office in St. Louis was built, its construction was considered an outstanding example of the architectural use of advanced technology. The Chicago fire of 1871 had focused attention on fireproof construction, which was accomplished in the old Post Office by building arches between the bottom flanges of the iron beams with ordinary bricks on edge. After a series of cliff-hanging public episodes, the precise fate of the old Post Office has still not been determined, but it will not be destroyed. There are plans to use the building for a commercial development, pending conveyance to developers by the General Services Administration.



## Dulles International Airport

Chantilly, Virginia

Federal Agency:  
Department of Transportation,  
Federal Aviation Administration

Architects and Engineers:  
Ammann & Whitney  
Eero Saarinen  
Burns & McDonnell  
Ellery Husted



**Widely celebrated as an architectural expression of the jet age, Dulles International Airport is as carefully thought out as it looks. The terminal building, the runways, the approaches and the interior details are all designed for the convenient and swift handling of both passengers and planes.**

Dulles International Airport was dedicated in November, 1962, as a public airport owned by the Federal Government.

Except for the problem of getting a cab driver to go there, Dulles International Airport is the world's most conveniently designed travel terminal. The architect, Eero Saarinen, has been called "the most professional of architects but an amateur airport designer," and the excellence of Dulles has been attributed to his amateur standing. In fact what a designer brings to a client is expertise in solving problems rather than specialized knowledge of a client's business. It is the very lack of such specialization that often enables a designer to see problems clearly, objectively, and in a new light.

Dulles has a number of significantly unique features, and surely the most important of these is the mobile lounge. Predicated on the conviction of the engineers and architects that there had to be a better way of handling passengers, the idea from the very beginning was to bring the passenger to the plane rather than bringing the plane to the passenger. This would avoid the expensive, awkward and tiring "fingers" of most jet airports. The simplest way of accomplishing this would have been to use buses, as many European airports do. But Saarinen believed that the solution to a jet-age terminal had to reside

**Passengers enter the terminal building between the outward-sloping concrete piers that make the approach so dramatic. Every step of the way from terminal doorway to plane is the result of study by designers and engineers.**



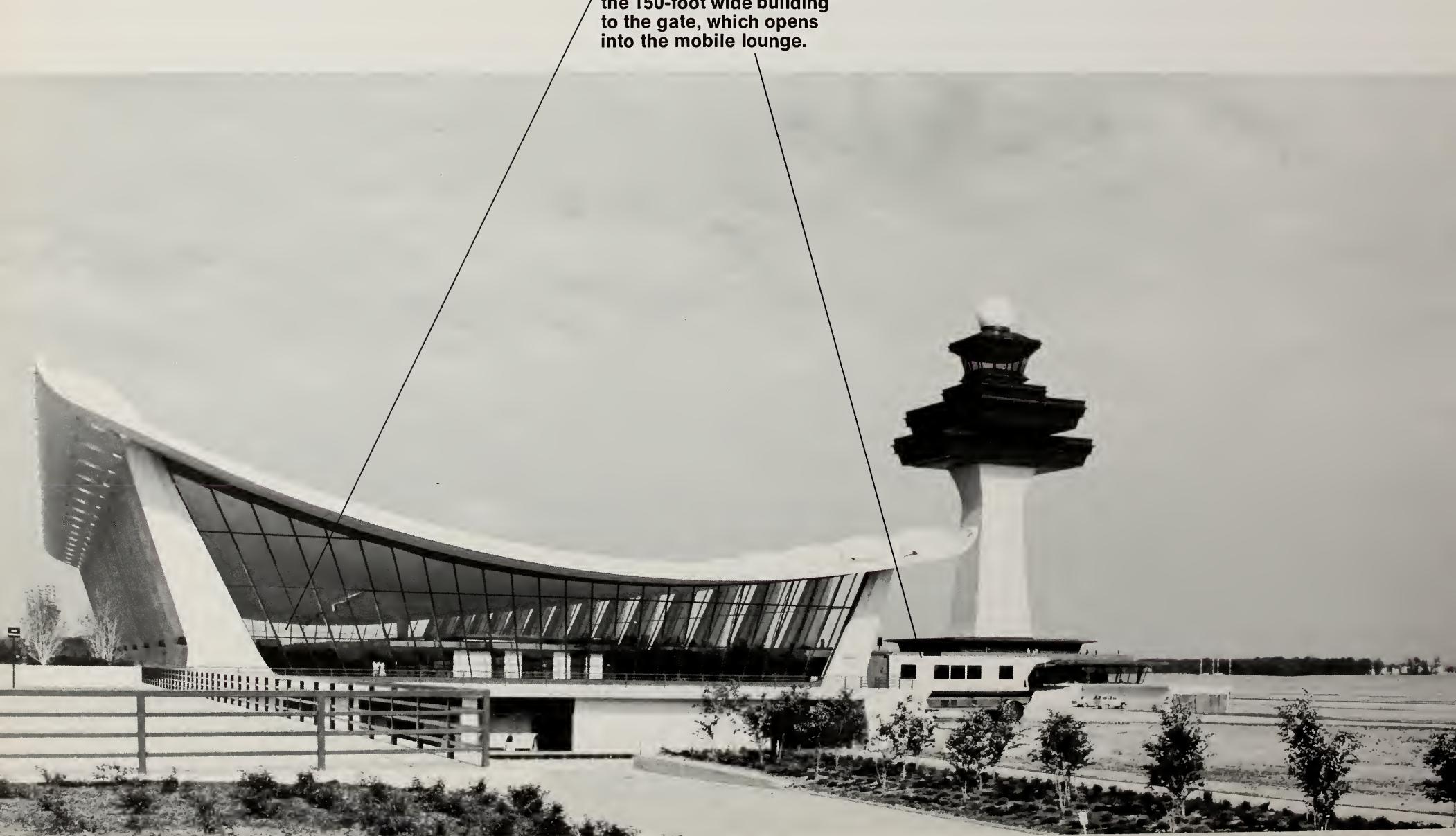
in the architecture.

The now-famous solution is the mobile lounge—a part of the terminal that detaches itself from the rest of the building as required. The concept of the mobile lounge is so logical that it is hard in retrospect to remember what an audacious idea it seemed at the time. In order to convince the airline management of the mobile lounges' reasonableness, Charles Eames was asked to prepare a short film. The result was "The Expanding Airport," produced for an audience of airline executives. It was instrumental in getting the lounges built.

A fleet of 21 lounges had been built by the time the airport opened



**Because the Mobile Lounge concept eliminated the need for long pedestrian “fingers”, the architects were able to make the terminal building unified and compact. Departing passengers enter directly in front of ticket counters, then cross the 150-foot wide building to the gate, which opens into the mobile lounge.**



**The lounge carries passengers to the planes without requiring the ramps or stairs used in European bus-loading systems.**



in 1962. Each is powered by a 172-hp engine. Each lounge holds 102 passengers with 71 of them seated. The lounge is 54 feet long, 16 feet wide, 17½ feet high, and weighs 76,000 pounds. With the advent of the 747 and the DC-10, modification in the design of the lounges was required, and there are now 12 "second generation" units.

Not all Dulles flights use the mobile lounge. Local feeder lines, executive planes, and helicopters can taxi directly to an apron in front of the terminal building, for conventional loading and unloading from ground level.

The design of the lounge is illustrative of the way in which design can achieve more than a client initially expects it to. Saarinen remarked that "no one asked us to grapple with the problem of a jet-age terminal beyond the question of pure architecture." But the architects and the engineers made an analysis of the *entire* problem. This included an investigation of jet manufacture and operation, highway and environmental factors, flight schedules, baggage handling, economics, stores and other services, and—most important of all—what people do at airports—how an airport works.

The data yielded by this research were reduced to a series of 40 charts that pinpointed three critical areas. The first was the difficulty of getting passengers to and from

**The lounges are docked at the main concourse level. The gate is the gate to a departure lounge rather than to the plane.**



**The interior has the character of a departure lounge, not of a bus. And it has space for hand luggage. Capacity of this lounge is 102, with 71 seated.**



planes, a difficulty that was sure to be magnified by the jet age. The second was the enormous cost of taxiing jet aircraft. The third was the need for flexibility in servicing aircraft. The mobile lounge addresses all three points.

The attention to detail that characterizes the mobile lounge applies to the entire airport. The runways have 25-foot-wide paved shoulders to prevent the jet engines from sucking in dirt and debris. The two-level terminal building is 600 feet long and can be expanded to 1,800 feet by the addition of a 600-foot extension at either end.

The main roof of the terminal is supported by a row of reinforced concrete frames. Supporting columns, founded in rock at their base, are connected by a reinforced concrete edged beam at their head. Any inward overturning force applied to the base of the

frames by the suspended roof is counteracted by the main floor acting as a horizontal strut.

The parking lot is slightly lower than the terminal ground floor, permitting three levels at the front of the terminal. The result is a passenger flow that separates arriving and departing passengers so effectively that the terminal building is uncongested even at peak times.

The easily installed, maintained and cleaned tandem seating—now a part of airport interiors the world over—was developed by Charles Eames for Dulles.

Taxiways run parallel to runways, to which they are linked by high-speed turnoffs. This makes it possible for a plane to leave a runway at a speed of 65 miles per hour.

The cost of Dulles International Airport, including the limited-access highway, was \$108.3 million. Construction costs are expected to be recovered in the first 30 years.



Driver cabs are located at each end of the lounge. The vehicles are 54 feet long, 16 feet wide.



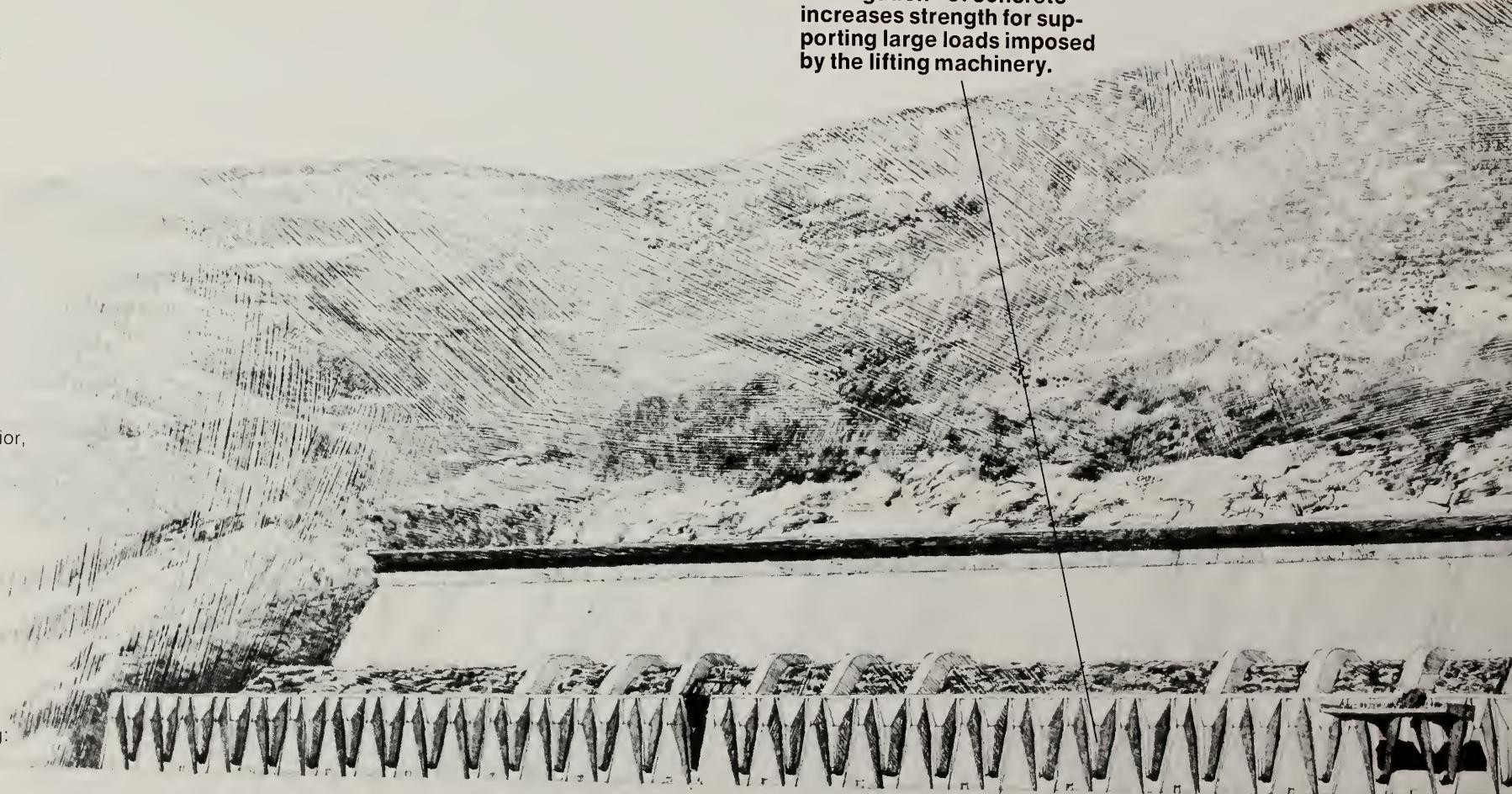
**Grand Coulee  
Third Power Plant**

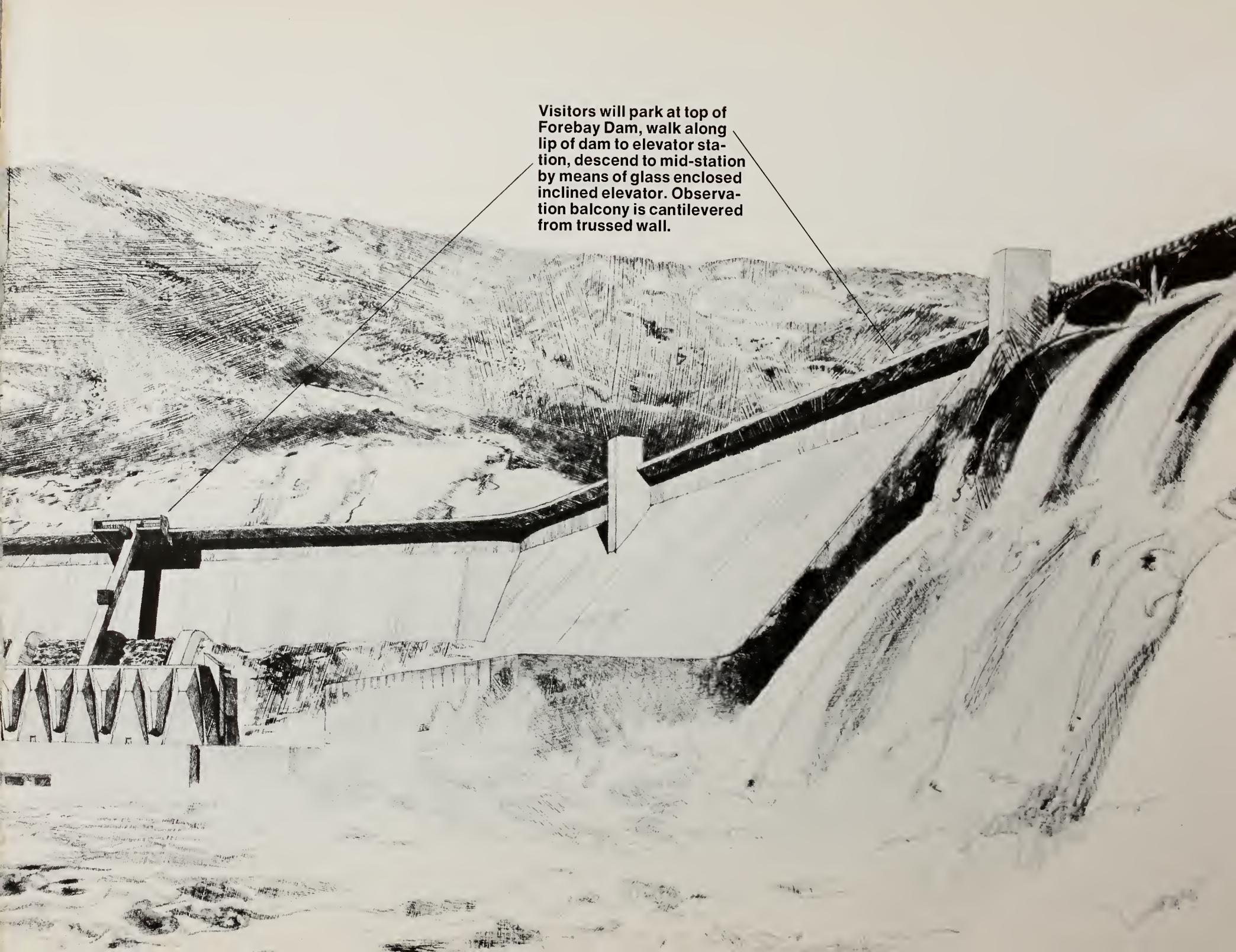
Columbia Basin,  
State of Washington

Funding Agencies:  
Department of the Interior,  
Bureau of Reclamation

Environmental planning:  
Kenneth W. Brooks,  
Consulting Architects:  
Marcel Breuer  
and Hamilton P. Smith  
with Thomas Hayes, Associate  
Architects and Engineers:  
Bureau of Reclamation,  
Engineering  
and Research Center,

**"Corrugation" of concrete  
increases strength for sup-  
porting large loads imposed  
by the lifting machinery.**

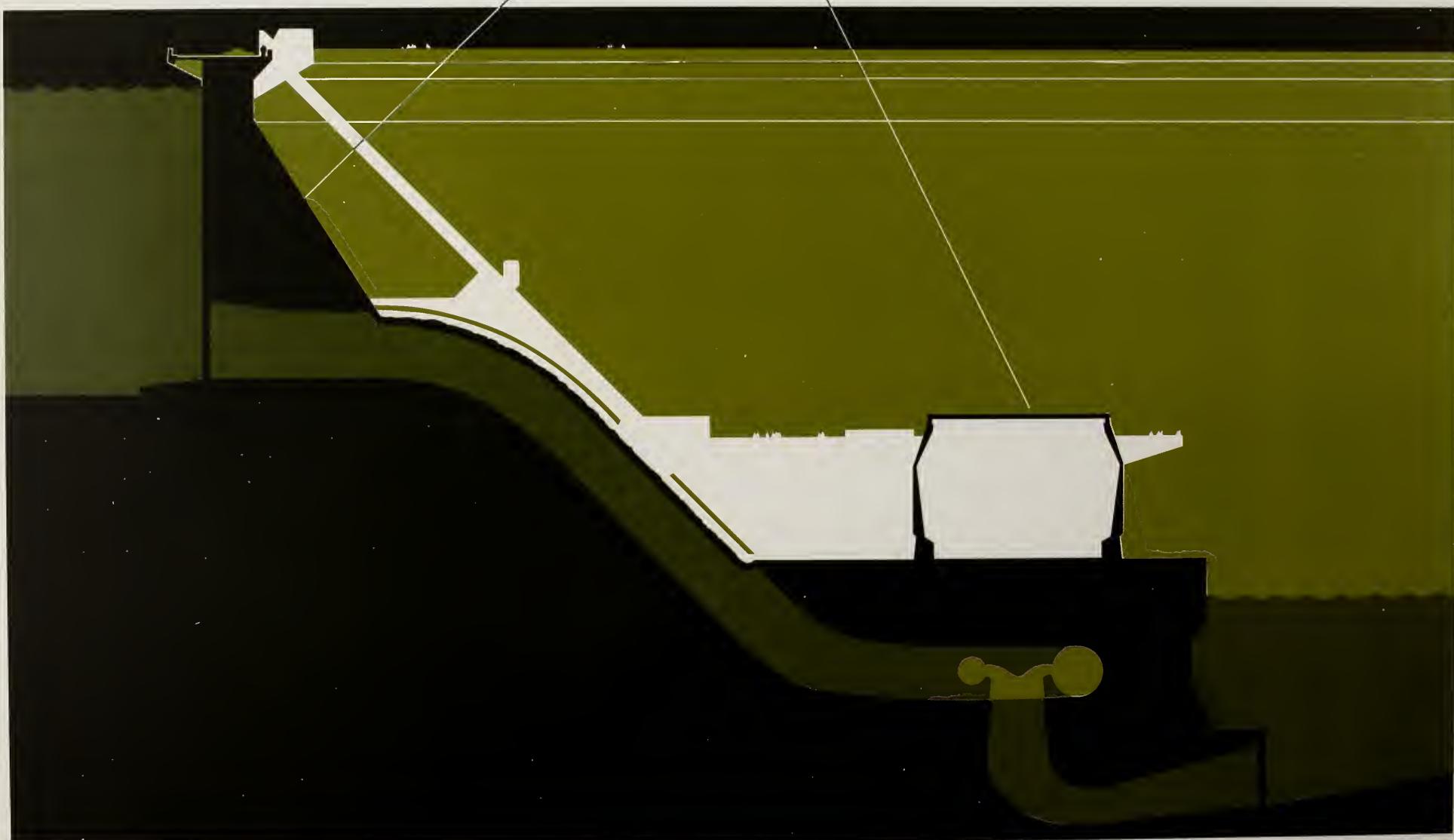




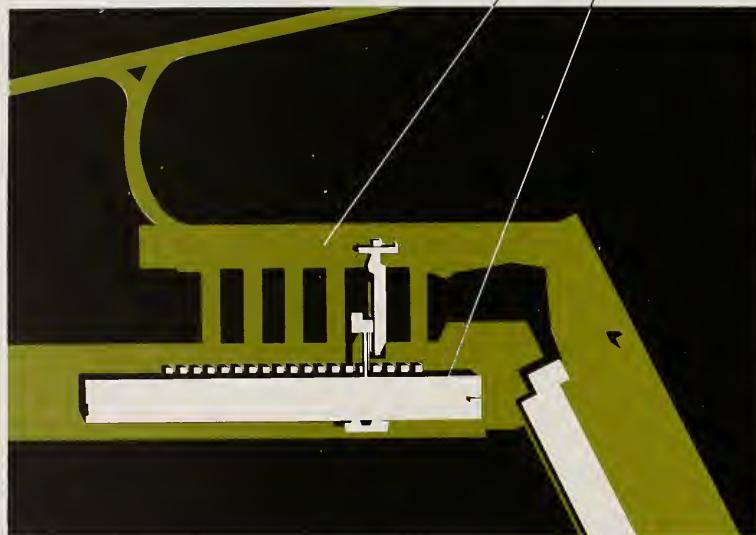
Visitors will park at top of Forebay Dam, walk along lip of dam to elevator station, descend to mid-station by means of glass enclosed inclined elevator. Observation balcony is cantilevered from trussed wall.

This architectural rendering illustrates a large dam structure, specifically the Forebay Dam. The dam is depicted with a textured, light-colored surface. A prominent feature is a cantilevered observation balcony extending from a trussed wall on the right side. A glass-enclosed inclined elevator is shown descending from the top of the dam. A parking area is visible at the top left, and a bridge spans the dam's width. The overall design is modern and industrial.

Visitor access route in cross section shows options: not everyone has to take the same tour. Full tour roughly parallels flow of water from Forebay Dam through the pen stocks, through the Third Power Plant and into the river downstream.



**Plan view shows existing dam, new Forebay dam, penstocks, and Third Power Plant.**



**Third Power Plant, shown here during construction, is designed to be integrated with Grand Coulee Dam and the new Forebay Dam.**



The Department of the Interior's Bureau of Reclamation has the delicate job of exploiting the environment on one hand, while protecting and preserving it on the other. Moreover, it has to accomplish all this in public: tens of millions of visitors use the Bureau's reservoirs for recreation, and hundreds of thousands more tour the sites during construction.

The Third Power Plant at Grand Coulee and Forebay dams will be the world's largest power complex. Each of the six generators in the Third Power Plant alone will have a capacity of 600 thousand kilowatts.

The architecture has a function beyond merely housing the generators. Its purpose is to enhance

a visit to the dam and make it understandable. Because of the majesty of the natural setting and the hugeness of the power project, the choice of a designer was especially sensitive.

The Bureau has its own Board of Environmental Consultants, and it was the Board that recommended Marcel Breuer and Associates as architects for the Third Power Plant and related visitors center.

Breuer chose to use reinforced concrete, eliminating the need for a steel structural skeleton. The scale of the power complex is, if anything, intensified; the building's profiled walls are cantilevered up out of bedrock, the multifaceted panels contrapuntally playing against the dam's stolid mass.

### Dallas Urban Design Programs and Strategies

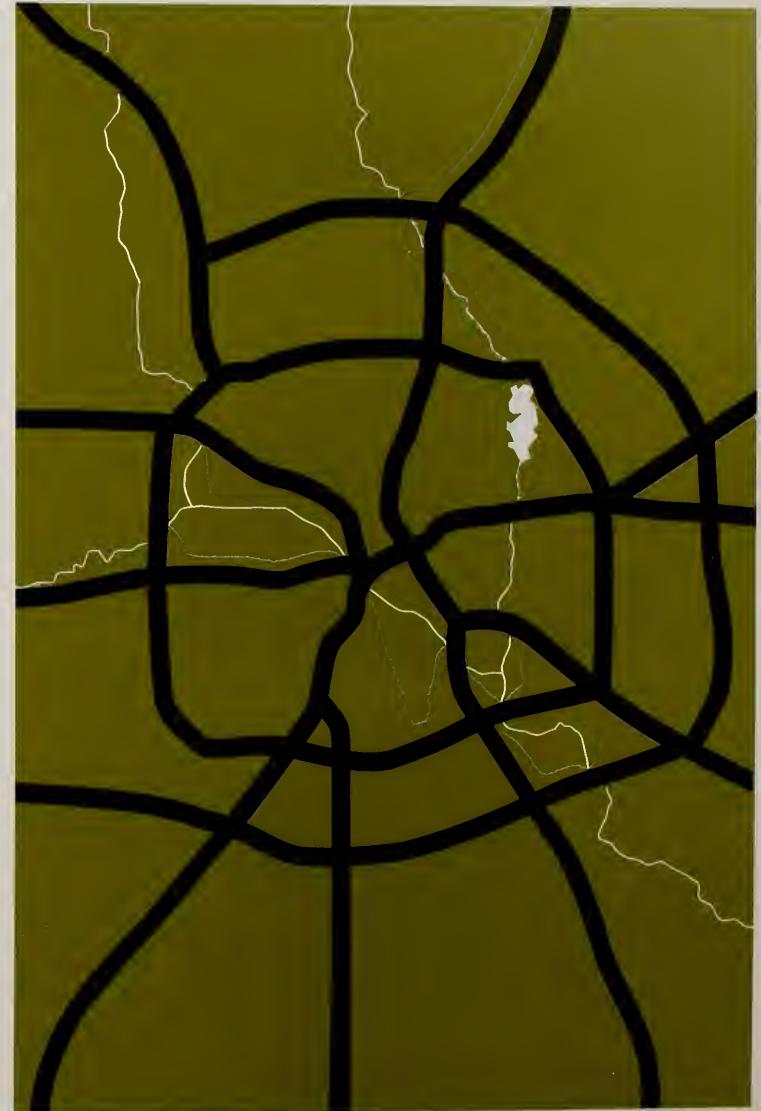
Dallas, Texas

Funding Agencies:  
Department of Housing  
and Urban Development  
City of Dallas

Designers:  
Weiming Lu and staff of the  
Urban Design Office,  
City of Dallas  
Ecological Study Consultant:  
Phillip Lewis



With an average of 3500 acres of land developed and urbanized each year, Dallas may be the fastest-growing metropolis in the country. To try to make this growth benign the city's urban designers are conducting 24 separate planning programs.



**These maps are computer print-outs indicating ecological data relating to the area shown at left in aerial view and plan.**

The Urban Design Office, Dallas Department of Planning and Urban Development is in the midst of an urban design plan that tries to tackle environmental problems on all fronts simultaneously. It consists of 24 distinct operational programs in ecology, historic preservation, sign ordinances, commercial districts, pedestrian and vehicular arteries, mini-parks, bond-financed capital improvement, fire protection, recreational facilities, storm drainage, neighborhood improvement, tree ordinances, land use, and housing.

Dallas is the eighth largest city in the nation, with a population of 900,000. The planners anticipate that by the year 2000 the population will more than triple.

The urban plan is most unusual in its comprehensiveness, in the number of areas of urban concern it touches on, in the depth in which it treats them, and in the variety of methods by which supporting data are gathered. In seeking to create a design responsive to the needs of Dallas citizens, the planners consistently turn directly to the citizens themselves for help. This process consists in part of a survey of how Dallas looks to the people who live there and in part of a concentrated campaign to tell people about the planning process and the progress being made. Since 1965 the city has conducted a "Goals for Dallas" program, in



**Computer-generated maps detail particular environmental features that are vulnerable to human impact.**

Maps provide a physical inventory of whatever can be seen, touched, felt, heard, smelled or otherwise perceived over an area of approximately 40,000 square miles.



which more than 100,000 residents have participated

The 16-man urban design team is interdisciplinary and includes architects, graphic designers, industrial designers, urban planners, political scientists, and ecologists. Their planning procedure is based on a physical inventory of all elements in the community that are sensate and measurable: everything that can be seen, touched, smelled, heard or described in physical terms.

The result is a series of ecological maps of 31 elements in an area of approximately 40,000 square miles. Weiming Lu, who directs the urban planning project, believes that a rational approach to the city's environmental problems is impossible without a comprehensive environmental data base. Dr. Philip Lewis, a Wisconsin environmental scientist, developed the study. The maps shown here are produced by a computer program initially developed for the Wisconsin Light and Power Company.

The computer program provides a stored data base and a series of computerized maps showing the area distribution of each element in the data bank. The maps shown here isolate the particular categories of environmental data and display it free of the other material found on maps normally. The map and photograph on page 64 show areas the printouts relate to.

**The effect of the Dallas ecological study depends on the ability of planners to influence decisions. The study serves both as a data resource and an instrument of persuasion designed to supplement the other urban studies.**

Each map is a graph of environmental vulnerability, showing in detail just where certain stresses can or cannot be withstood. This is as essential in environmental planning as it was essential for Apollo planners to know the physiological stresses the astronauts would be subject to in space. Data were collected from such varied sources as geological survey maps, NASA space photographs, bird-watching records, and other field work. Then the data were copied onto a form that could be optically scanned—a service performed by volunteers from the League of Women Voters and other groups.

Actually, two sets of maps have been generated. One provides a detailed examination of the 900-square-mile Dallas County area. The other provides a regional overview covering approximately 40,000 square miles. The regional overview takes the form of a series of overlays on a base map. Its primary uses are to monitor regional change in terms of critical resources and to display Dallas in its ecological context. Interestingly, neither the Planning and Urban Development Department, nor the City of Dallas itself has any control or much influence over the land use outside the city limits. But, Lu observes, "the political boundary does not relate to the natural features at all. In order to protect Dallas we have to look beyond."



## Spaces for Recreation

### Funding Agencies:

(The Court of Ideas)  
Office of Economic Opportunity;  
Pittsburgh Parks and Playgrounds  
Society; Carnegie-Mellon University

### (Tyson Park)

Department of Housing  
and Urban Development  
City of Knoxville

(Harlem River Bronx State Park)  
Department of the Interior  
New York State Park Commission

### Designers:

(The Court of Ideas)  
Community Design Associates  
The Organizers

### (Tyson Park)

Oliphant and Kersey, Incorporated  
(Harlem River Bronx State Park)  
M. Paul Friedberg & Associates

**The Court of Ideas is a Pittsburgh, Pennsylvania neighborhood center in which design process has become integral to community life. The project was not designed for the community, but designed and built by the community, and continues to be.**

**Tyson Park is an economically maintained leisure center attracting large numbers of Knoxville residents and University of Tennessee students.**



We need more than one kind of recreational area. The three pictured here perform distinct functions. What they have in common is their recognition of the design imperative in play for both children and adults.

Tyson Park in Knoxville, Tennessee, is the most conventional of the three. It was redeveloped in 1970 with \$90,000 of local money and \$81,000 of an Open Space Grant from the Department of Housing and Urban Development.

The heavy wooden playground equipment has been almost maintenance free, except for the routine replacement of swing hangers and seats. The park is designed for people of all ages and, curiously, the major attraction for all age groups is the playground area. The high intensity of park use since redevelopment was completed has virtually eliminated vandalism in Tyson Park.

Harlem River Bronx State Park is an effort to integrate open-space parkland into the full life of the city, and transform the latter in the process. It is predicated on the designer's view that large-scale state and Federal parks cannot serve cities well because people have to leave the cities to get to them. Neither is the city served by small-scale escape parks that provide no more than a breath of fresh air. This park is intended as part of city life, with the park's theaters,

**On 65 acres of Harlem River waterfront a new kind of park is in the works—one that uses open space to bring elements of the city together, rather than to provide a refuge from them.**

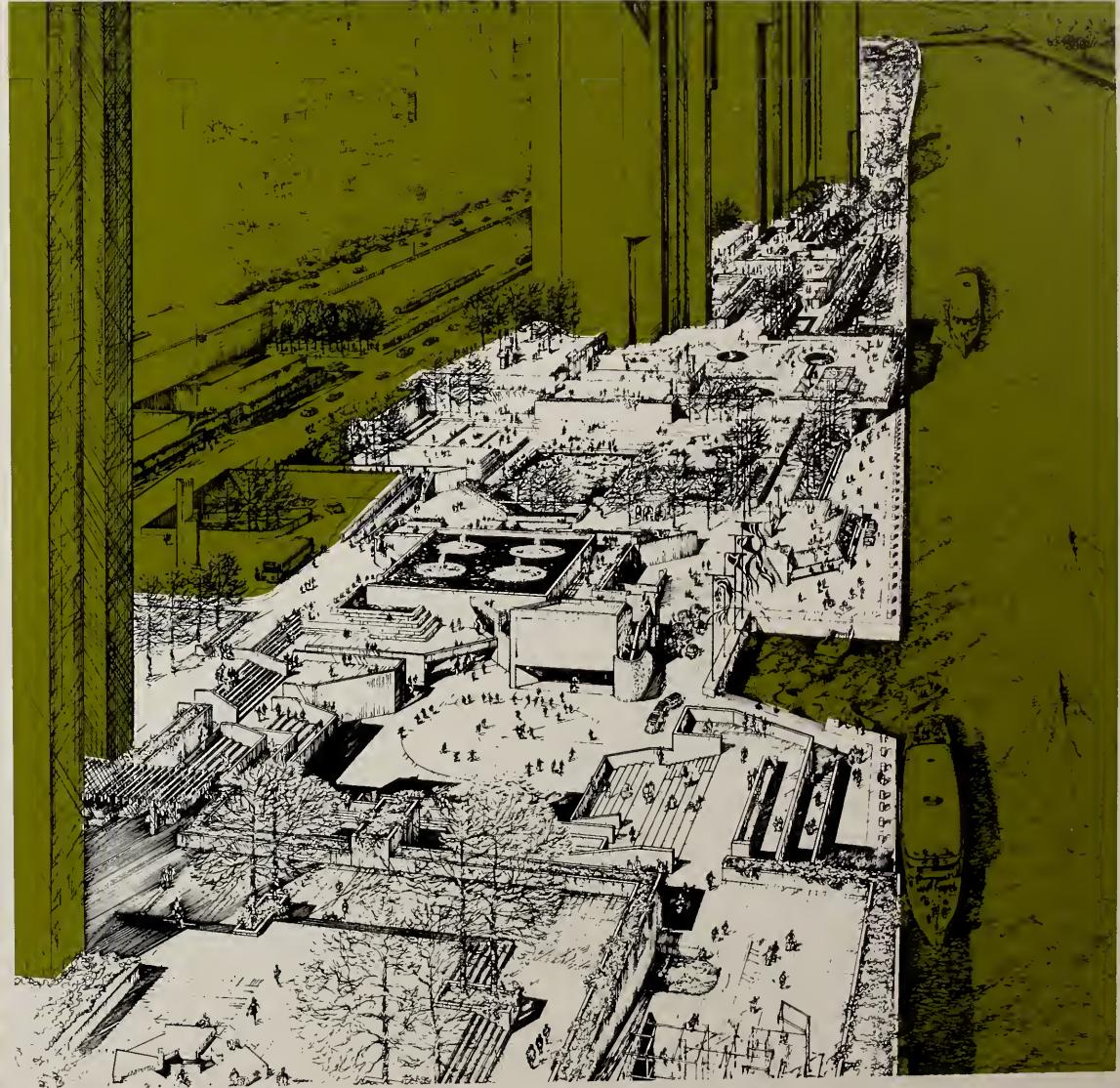
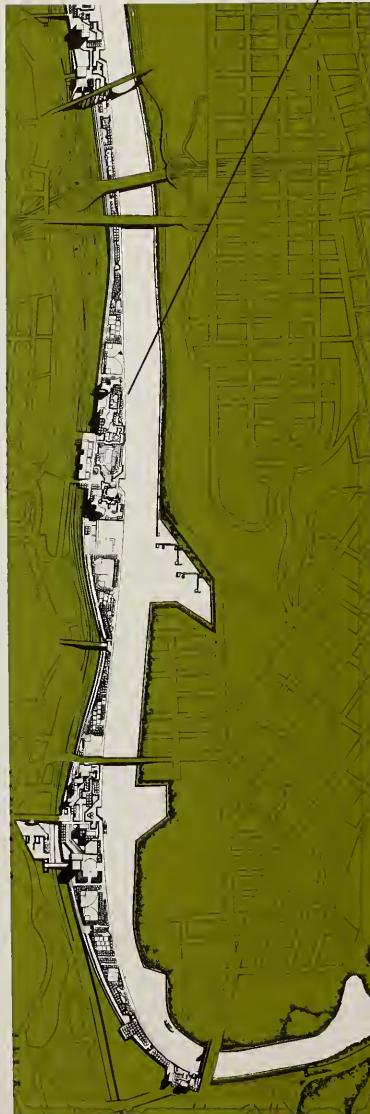
swimming pools, skating rinks and malls spilling into the commercial and residential areas.

A particularly appealing feature of this park is the promise it holds of restoring the Harlem River to recreational use. It is possible to live in New York City for years without ever noticing that Manhattan is an island. Parks like this one should help make it impossible.

The Harlem River Park Housing towers, under development in conjunction with the park, contain 2000 units of low- and middle-income housing.

The Court of Ideas is not a park or a playground or, for that matter, a court. It is the first step in Architecture 2001, a program that seeks to rehabilitate both neighborhoods and people without drawing any hard lines about which is which.

In a back lot at 2001 Centre Street in Pittsburgh's largely black Hill District, the Court of Ideas represents a new level of situation design. This outdoor amphitheater and recreation area was designed to be created by community involvement. It was built by a team of architectural students and neighborhood residents, including addicts and ex addicts (one of whom was job captain). Its roots in community involvement, the project continues with workshops, jazz, rap sessions, poetry readings that grow out of the community and back into it.



**“State of Hawaii  
Land Use Districts  
and Regulations Review”**

State of Hawaii

Funding Agencies:  
Department of Housing  
and Urban Development  
State of Hawaii Land  
Use Commission

Architects, Planners  
and Landscape Architects:  
Eckbo, Dean, Austin & Williams

**Location, economy and history combine to place the Hawaiian environment in urgent need of protection. But the state has a land use law designed to protect it.**

**Map of Island of Maui shows urban, rural, agricultural and conservation boundaries for land use.**

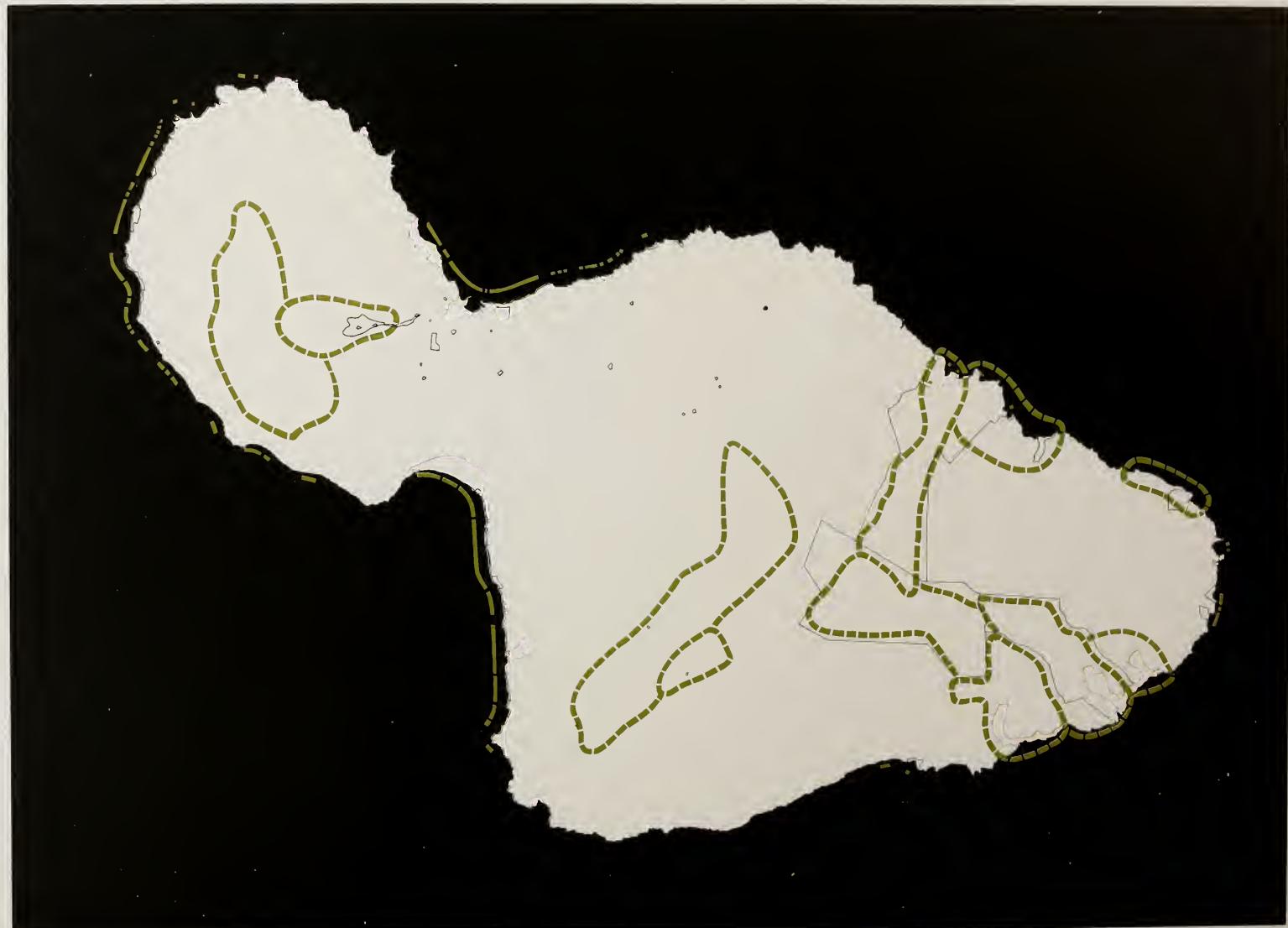


**Maui's natural and cultural resource areas are divided into existing parks, proposed parks, general scenic areas, special scenic sites, historic sites, and the sandy beaches for which the islands are celebrated.**



Planning depends on a variety of tools, some of them cultural, some political, some legislative. Since cultural and political scenes shift unpredictably, and because laws change, the tools in the planning process must be surveyed from time to time. The need to do this is made more urgent by the fact that professional planners are in the business of forging new tools and refining existing ones.

This study is a review of land use districts and regulations for the State of Hawaii. It came about, and remains valid, because of Hawaii's unique land use law. In the



opinion of the designers who performed the study, "Hawaii is the only state in the union with virtually all of the tools, in law and in operation, for protection of irreplaceable land resources."

Design is the means of realizing the possibilities inherent in this legislation. The study is a protective review program, analyzing the objectives of the land use act, land use commission procedures, taxation policies, boundary agricultural land preservation, and shore conservation.

Based on an island economy dependent on military bases, sugar



**Map of present agricultural uses on Maui distinguishes cultivated lands, lands now used for grazing, and districts that are already urban.**



Map depicts Island of Maui in terms of soils with high agricultural potential. Maui is the state's second largest area of prime agricultural land.



cane and pineapple, pre-statehood Hawaii found in tourism its major hope and its major threat. Environmental protection is especially important to Hawaii but the principles are as valid for all our states.

These maps depict the island of Maui, showing its urban, rural, agricultural, and conservation land use district boundaries. With a population of 46,656, Maui is, after Oahu, the second-largest area of prime agricultural land in the state.



### Auditorium Forecourt Fountain

Portland, Oregon

Funding Agencies:  
Department of Housing and  
Urban Development  
City of Portland  
Tax Increment Funds

Designers:  
Lawrence Halprin & Associates

**Facing Portland's remodeled civic auditorium, the Forecourt Fountain fills an entire city block. People use it as a many-leveled garden of concrete, grass, trees and water.**



**Effective design of public services is itself an essential public service, as in this watery culmination of a sequence of parks, plazas, malls and promenades connecting downtown Portland with an urban renewal area.**

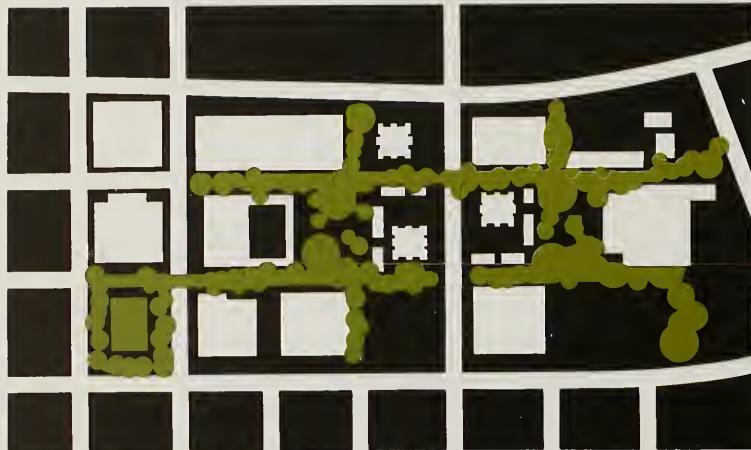
The Auditorium Forecourt Fountain in Portland, Oregon, has been called "one of the most important urban spaces since the Renaissance" by New York Times architecture critic Ada Louise Huxtable. She went on to describe it as a throwback to "public city spaces of deliberately conceived beauty and pleasurable utility." The fountain, which was designed for the Portland Development Commission as part of a HUD Urban Renewal Program, takes up an entire city block. Both the fountain and the eight-block-long sequence of pedestrian open spaces of which it is a part were designed by Lawrence Halprin & Associates.

In 1966 the land was purchased by the Portland Development Commission with HUD assistance to be used as open space, countering vehicular use of the streets.

The design is based on the notion of bringing the cascades of Portland's High Sierras into the city itself. But it is not a simple, literal imitation of nature. It consists of a configuration of concrete tiers, through which water winds, culminating in a massive waterfall 80 feet across and almost 20 feet high.

The central concern of the designers was to create an area that people of all ages and types would use in a variety of ways. They do use it in a variety of ways—for walking, wading, reading, picnicking, and watching others.

**Eighteen-foot cascade  
pours over battered tapered  
walls constructed by means  
of continuous concrete pours  
and irregular board forming.**



One of the design problems most resistant to solution is the problem of keeping the sense of natural resources alive in an urban environment. The Auditorium Forecourt Fountain (a preposterously pedestrian name for so lyrical a project) is dominated by water, not just in the obvious sense of scale, but by the fact that people actually soak themselves and splash in it.

Built at a cost of \$498,000 (the land itself cost \$534,000), the design called for continuous concrete pouring of the walls and hand-placing of the boulder-stone aggregate used in the floor of the pools and channels. Seating facilities, lighting, and trash containers are all built in.

Safety—as related to both accidents and crime—is a basic problem in the design of public spaces, especially one such as this. The

client, the designers, and the public at large attribute the park's success in safety and maintenance to date to the "Wonderwolf Patrol." This is a volunteer patrol of teenagers recruited by the Portland Development Commission to watch over the Fountain and the people who use it. The patrol so far has turned out to be an effective, gentle agent for enforcing the rules where necessary. There is astonishingly little resentment, and their presence has to be regarded as one of the most desirable features of the project.

The Auditorium Forecourt Fountain is both an expression of community pride and a cause of it. Teenagers volunteer for the patrol out of a sense of pride in the designed environment. Their work is effective largely because the public generally shares this pride.



**Designed-in safety and maintenance features are supplemented by a volunteer patrol of young park users who are proud of the facility and feel responsible for protecting it. Other users cooperate willingly.**

**All lighting, trash containers, benches and other seating surfaces are cast in place. Since the Forecourt serves as an amphitheatre, lighting had to be designed to serve that purpose as well as those of security and dramatic effect.**



Residents like to look at the falls and listen to them and look at others looking at and listening to them.

A space for public enjoyment, Portland's fountain plaza contributes to the rhythm of the city's daily life: at 11:00 each morning the falls are turned on, a joyous daily public spectacle.



## Credits and Acknowledgements

### Visual Communications

14

#### **National Park Service Minifolders**

Client and Funding Agency: Department of the Interior, National Park Service.

Designers: National Park Service, Division of Publications Staff, Vincent Gleason, Chief.

16

#### **Internal Revenue Service "Teaching Taxes" program**

Client and Funding Agency: Department of the Treasury, Internal Revenue Service.

Designers: IRS Publishing Services Branch Design Group, Larry Rolufs, Design Manager; "The Teacher's Guide" (Publication 19), "Understanding Taxes", General Edition (Publication 21), "Understanding Taxes", Farm Edition (Publication 22), David Haussman, Designer; "Farmer's Tax Guide: Income and Self-Employment Tax" (Publication 225), Betty Moran, Designer.

18

#### **Internal Revenue Service Recruiting Brochures**

Client and Funding Agency: Department of the Treasury, Internal Revenue Service.

Designers: IRS Publishing Services Branch Design Group, Larry Rolufs, Design Manager; "A New Dimension in Taxation" (Publication 618), "Treasury Enforcement Agent" (Publication 619), "Tax Auditor" (Publication 620), "Revenue Agent" (Publication 621), "Revenue Officer" (Publication 622), "Internal Auditor" (Publication 652), Dick Servatius, Designer.

20

#### **United States Postal Service Design Control Guidelines**

Client and Funding Agency: United States Postal Service.

Designers: United States Postal Service, Creative Services, Vincent Hoffman, Division Manager; Raymond Loewy/William Snaith, Inc.

21

#### **USIA Design Manual**

Client and Funding Agency: United States Information Agency.

Designer: United States Information Agency, Robert Sivard, Art Director.

22

#### **"Atoms At Work"**

Client and Funding Agency: Atomic Energy Commission.

Architect: Victor Lundy; Planning and Coordination: Albert H. Woods; Exhibit Design: Carlos Ramirez; Film Production: Francis Thompson.

### Interiors and Industrial Design

28

#### **The Acorn School**

New York, New York

Funding Agencies: Department of Housing and Urban Development, Interest Supplement on Rental and Cooperative Housing Mortgage, Phipps Houses.

Client: Phipps Houses.

Architects: Mayers & Schiff; Mechanical and Electrical Engineers: Andreassen Associates; General Contractor: Harvey Construction Corporation.

Net Area: 54,000 sq. ft.

32

#### **Space Planning and Interior Design Study for the Operations Control Center Building for the Washington Metropolitan Area Transit Authority**

Washington, D.C.

Client and Funding Agency: Washington Metropolitan Area Transit Authority.

Architects and Planners: Keyes, Lethbridge and Condon, Associate in Charge of Design, Jack McCartney.

34

#### **Laboratory Outfitting for The Salk Institute for Biological Studies**

San Diego, California

Funding Agencies: Department of Health, Education and Welfare, National Institutes of Health, Health Research Facilities Grant #FR-03136; The National Foundation; The Avalon Foundation; Eli Lilly & Co.; Kettering Fund.

Client: The Salk Institute.

Architect: Louis I. Kahn, Project Architect, John E. MacAllister; Laboratory Consultants: Earl L. Walls Associates, Project Manager, Ulrich M. Lindner; Mechanical and Electrical Engineers: Fred S. Dubin Associates; General Contractor: George A. Fuller Co.

Net Laboratory Area: 48,750 sq. ft.

36

#### **"Interior Design in Manned Spacecraft or Space Stations, Literature Search #20724"**

Client and Funding Agency: National Aeronautics and Space Administration, Scientific and Technical Information Office, NASA Headquarters.

Prepared at the request of the First Federal Design Assembly.

38

#### **Morgantown Personal Rapid Transit System**

Morgantown, West Virginia

Client and Funding Agency: Department of Transportation, Urban Mass Transportation Administration.

Prime Contractor: The Boeing Company; Subcontractors: Frederic R. Harris, Inc., A&E design of guideway and structures; Corbett, Thorberg, Stechow, Jordan, architects of guideway and structures; Alden, Self-Transit Systems Corp., design and manufacture of power head and steering system, manufacture of passenger module; Frank Irey Jr., Inc., A&E construction; The Melbourne Bros. Construction Co., A&E construction; Trumbull Corporation, A&E construction; The Bendix Corporation, Aerospace Systems Division, design and manufacture of control and communication system; Digital Equipment Corporation, manufacture of computers; Systems Development Corporation, design of software; Barnes and Brass Company, installation of control and communication system; Avtek Systems, Inc., design and manufacture of propulsion control system.

42

#### **Student Housing**

State University College at Brockport Brockport, New York

Funding Agencies: Department of Housing and Urban Development, College Housing Program, Supplementary Loan, Federal Grant #CH-NY-288(D); Dormitory Authority of the State of New York.

Client: Dormitory Authority of the State of New York, William A. Sharkey, Administrative Director; Douglas Hasbrouck, Director of Design and Construction Services.

Consultants to the Dormitory Authority: Philip Bobrow & Associates Ltd., Concordia Management Ltd.; Design/Build Team: Caudill Rowlett Scott, Architects; M. Paul Friedberg & Associates, Landscape Architects; The Engineers Collaborative; W. E. O'Neill Construction Co.

Site Size: 20 acres.

44

#### **St. Francis Square**

San Francisco, California

Funding Agencies: Department of Housing and Urban Development, Low and Moderate Income Housing Insurance; Joint Pension Fund, International Longshoremen's & Warehousemen's Union, Pacific Maritime Association.

Client: St. Francis Square Cooperative Apartments, Inc.

Architects: Marquis & Stoller; Structural Engineer: Eric Elsesser; Mechanical and Electrical Engineers: Kenward S. Oliphant; Landscape Architects: Lawrence Halprin & Associates; General Contractor: Jack Baskin.

Site Size: 355,122 sq. ft.

48

#### **Everett McKinley Dirksen Building**

Chicago, Illinois

Client and Funding Agency: Public Buildings Service, General Services Administration.

Architects and Engineers: Schmidt Garden & Erikson, The Office of Mies van der Rohe, D. F. Murphy Associates, A. Epstein & Son's, Inc.; Superstructure Contractors: Paschen Contractors, Inc. and Gust K. Newberg Construction Co.; Substructure Contractors: Paschen Contractors, Inc. and Peter Kiewit Son's Co.

Gross Area of Building: 1,365,000 sq. ft.; Net Assignable Area of Building: 959,000 sq. ft.

50

#### **The National Collection of Fine Arts and The National Portrait Gallery, Smithsonian Institution**

Washington, D.C.

Funding Agency: Public Buildings Service, General Services Administration.

Client: Smithsonian Institution.

Architect: Faulkner, Stenhouse, Fryer & Faulkner, Waldron Faulkner, Project Architect; Consultants: Victor Proetz, Bayard Underwood; Structural Engineers: Gongwer & Kraas; Mechanical Engineers: Wilberding Company, Inc.; Egli & Gompf; Lighting Consultant: Stanley R. McCandless; Landscape Architect: Lester A. Collins; General Contractor: Grunley-Walsh Construction Co.

50

#### **Old St. Louis Post Office**

St. Louis, Missouri

Funding Agency: Public Buildings Service, General Services Administration (Pending conveyance under Public Law 92-362).

Client: The Apted/Hullung Group, Developer, Manager, and Leasing Agent: The Apted/Hullung Group, Jim Prentice, General Manager.

Architects, Planners, and Landscape Architects: Peckham-Guyton, Inc., Kimbal Cohn, Project Architect; Mechanical and Electrical Engineers: William Tao & Associates, Inc.; Design Consultants: Burks & Landberg, Architects.

51

#### **Renwick Gallery, National Collection of Fine Arts, Smithsonian Institution**

Washington, D.C.

Client and Funding Agency: Smithsonian Institution.

Restoration/Phase I: Functioning Agent: Public Buildings Service, General Services Administration.

Architects and Engineers: John Carl Warnecke and Associates, John Carl Warnecke, Principal; General Contractor and Project Manager: American Construction Co., Inc., William Finglass, President; Prime Subcontractor for Exterior Restoration: Universal Restoration, Inc., Kenneth S. Eisenberg, President.

Restoration/Phase II: Architects: Hugh Newell Jacobsen & Associates, Hugh Newell Jacobsen, Principal.

52

#### **Dulles International Airport**

Chantilly, Virginia

Client: Department of Transportation, Federal Aviation Administration.

Architects and Engineers: Ammann & Whitney, Eero Saarinen, Burns & McDonnell, Ellery Husted.

58

#### **Grand Coulee Third Power Plant**

Columbia Basin, State of Washington

Client: Department of the Interior, Bureau of Reclamation.

Environmental Planning: Kenneth W. Brooks.

Power Plant/Consulting Architects: Marcel Breuer and Hamilton P. Smith with Thomas Hayes, Associate; Architects and Engineers: Bureau of Reclamation Engineering and Research Center, Harold G. Arthur, Director of Design and Construction; Contractors: Vinnell-Drake-Lockheed-Mannix, joint venture.

Visitors Center/Architects: Marcel Breuer and Hamilton P. Smith with Thomas Hayes, Associate; Exhibit Consultants: Chermayeff & Geismar Associates.

Aquatic display Consultants: Lawrence Halprin & Associates.

### **Landscaped Environment**

64

#### **Dallas Urban Design Programs and Strategies**

Dallas, Texas

Funding Agencies: Department of Housing and Urban Development, Urban Planning Assistance Program, Federal Grant #12-130(CR); City of Dallas General Fund.

Client: Department of Planning and Urban Development, Dallas, Texas.

Designers: Weiming Lu and staff of the Urban Design Office, City of Dallas; Ecological Study: Phillip Lewis, General Consultant; Dr. Warren Pulich, Dr. William Mahler, Dr. L. J. Bartelli, Dr. Fred Gehlback, Dr. Charles Dodge, Richard Coffee, Clifford Powell, Specialists.

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#### **The Court of Ideas**

Pittsburgh, Pennsylvania

Funding Agencies: Office of Economic Opportunity, CAP Grant #CG-PA-0133; Pittsburgh Parks and Playgrounds Society; Carnegie-Mellon University.

Client: House of Cultures, Sidney Wilson, Director.

Designers: Community Design Associates (formerly Architecture 2001), Troy West, Architect; Jay Greenfield, Psychologist; Chucky Dial, Community Director; Doaks Brown and Ronney Conners, Community Co-Directors; The Organizers, Ed Ellis, Adult Advisor; Dicky Morton, President.

Site Size: 2,400 sq. ft.

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#### **Tyson Park**

Knoxville, Tennessee

Funding Agencies: Department of Housing and Urban Development, Open Space and Beautification Division, Tennessee Project #B8; City of Knoxville General Fund.

Client: City of Knoxville, Tennessee. Landscape Architects: Oliphant and Kersey, Inc.; General Contractor: V. L. Nicholson Company, Inc. Site Size: 21 acres.

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#### **Harlem River Bronx State Park**

New York, New York

Funding Agencies: Department of the Interior, Federal Bureau of Outdoor Recreation, Federal Grant #31-00087; New York State Park Commission for the City of New York.

Client: New York State Park Commission for the City of New York. Designers: M. Paul Friedberg & Associates.

Site Size: 65 acres.

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**"State of Hawaii Land Use Districts and Regulations Review"**

Funding Agencies: Department of Housing and Urban Development, Urban Planning Grant Hawaii P-21; State of Hawaii Land Use Commission.

Client: State of Hawaii Land Use Commission.

Architects and Planners: Eckbo, Dean, Austin & Williams, Edward A. Williams, Principal in Charge; Howard B. Altman, Project Administration and Urban Districts; C. Christopher Degenhardt, Agriculture and Rural Districts; Grant R. Jones, Conservation Districts; Consultants: Baxter, McDonald and Company, Dr. Leslie E. Carbert, Padgett, Greeley, Marumoto and Akinaka, The Environmental Analysis Group, Williams and Mocine.

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**Auditorium Forecourt Fountain**

Portland, Oregon

Funding Agencies: Department of Housing and Urban Development, Urban Renewal Program, Federal Grant #ORE-R1; City of Portland Tax Increment Funds derived from the South Auditorium Urban Renewal Project Area.

Client: Portland Development Commission.

Designers: Lawrence Halprin & Associates, Satoru Nishita, Partner in Charge; Byron McCulley, Project Director; Angela Danadjieva Tzvetin, Project Designer; Structural Engineers: Gilbert, Forsberg, Diekmann & Schmidt; Mechanical and Electrical Engineers: Beamer/Wilkinson; General Contractor: Schrader Co.

Introduction, page 11: Magruder Environmental Therapy Complex in Orlando, Florida, designed by Leland G. Shaw.

**About This Book**

*The Design Necessity* was conceived and produced for the First Federal Design Assembly, which was the Government's initial step in a high-priority program to raise design standards throughout all Federal agencies. It is directed mainly toward the Federal administrator; however, it also provides a definition of design ideas and goals for design performance crucial to the designer.

*The Design Necessity* is a collection of designs supported by the Federal Government and chosen on the basis of performance—case studies of Federal projects that work because they were designed to work. These projects illustrate aspects of the design process in which objects, systems, and environments are related to people.

The book further asserts that: there are sound, proven criteria for judging design effectiveness; design is an urgent requirement, not a cosmetic addition; design can save money; it can save time; it enhances communication; it simplifies use, simplifies manufacture, simplifies maintenance; the design necessity is recognizably present in projects ranging in scale and complexity from a postage stamp to a highway system; the absence of design is a hazardous kind of design (*not* to design is to suffer the costly consequences of design by default); on any given project, designers and government officials have the same basic goal—performance; and effective design of public services is itself an essential public service.

Ivan Chermayeff, a designer from New York City, and Richard Saul Wurman, an architect and planner from Philadelphia, served as program co-chairmen of the Assembly. Ralph Caplan is a writer and Peter Bradford a designer, both from New York City.

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# The Design Necessity

Ivan Chermayeff

Richard Saul Wurman

Ralph Caplan

Peter Bradford

Prepared for the

First Federal Design Assembly

sponsored by the

Federal Council on the Arts

and the Humanities

under a grant from the

National Endowment for the Arts

"There should be no doubt that the Federal Government has an appropriate and critical role to play in encouraging better design."

**President Richard M. Nixon**  
*Federal Design Improvement*  
Message, May 16, 1972

"As a major client of design services, the Government has the opportunity to call upon the finest talents in the Nation to assist in ensuring the quality of Federal architecture and graphics. The National Endowment for the Arts and the National Council on the Arts endorses the purpose of the First Federal Design Assembly to create an awareness of this opportunity among Government officials."

**Nancy Hanks**  
Chairman, National Endowment for the Arts  
and Chairman,  
National Council on the Arts

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This book of Federal case studies illustrates how design has demonstrably affected the efficiency, economy, effectiveness and safety of a myriad of Federal projects including visual materials, buildings, interior spaces and the environment. It is intended to enhance the reader's understanding that design is essential to the performance of every program sponsored by the Federal Government."

**J. Carter Brown**  
Chairman, First Federal Design Assembly Task Force  
and Chairman,  
Commission of Fine Arts  
and Director,  
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